

**PORTLAND HARBOR RI/FS**  
**APPENDIX G**  
**DETAILED COST EVALUATION**  
**PORTLAND HARBOR FEASIBILITY STUDY**

**DRAFT FINAL**

August 18, 2015

## **Detailed Analysis Cost Estimates**

**The cost spreadsheets included in this appendix were developed in accordance with EPA 540-R-00-002 (OSWER 9355.0-75) July 2000.**

**These costs should be used to compare alternative relative costs. Costs for project management, remedial design, and construction management were determined as percentages of capital cost per the guidance. Costs for these work items may not reflect costs for implementation. These costs are determined based on specific client requirements during implementation.**

TABLE CS-ALT

## ALTERNATIVE COST SUMMARY

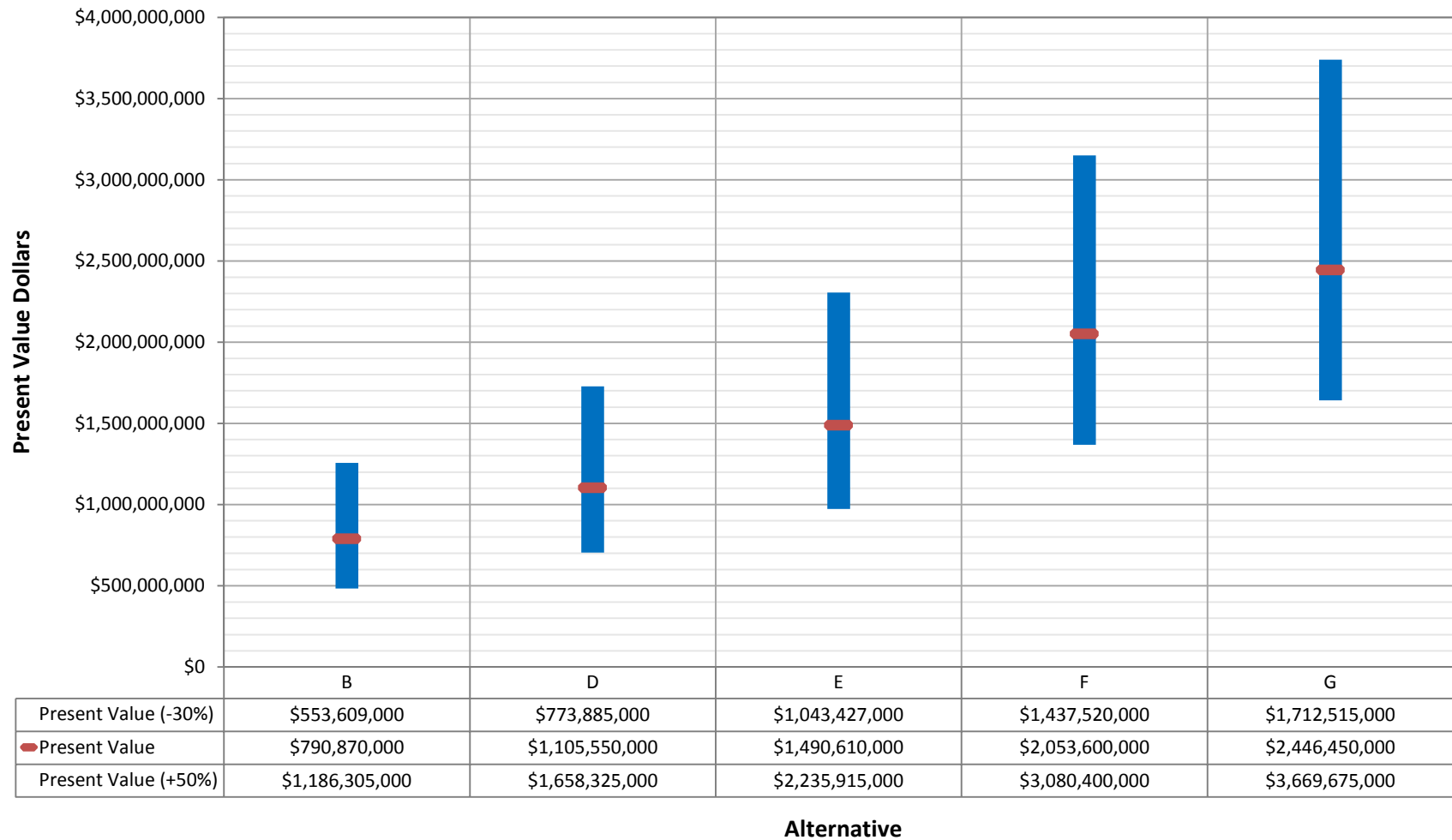
**Site:** Portland Harbor Superfund Site  
**Location:** Portland, Oregon  
**Phase:** Draft Feasibility Study (-30% to +50%)  
**Base Year:** 2015

<u>Alternative</u>	<u>Total Capital Cost</u>	<u>Total Annual O&amp;M Cost</u>	<u>Total Periodic Cost</u>	<u>Total Non-Discounted Cost</u>	<u>Present Value Cost</u>	<u>Minus 30% Plus 50% Range</u>
A	\$0	\$0	\$0	\$0	\$0	\$0
B	\$703,906,000	\$0	\$337,522,000	\$1,041,428,000	\$790,870,000	\$553,609,000 to \$1,186,305,000
D	\$1,023,004,000	\$0	\$460,170,000	\$1,483,174,000	\$1,105,550,000	\$773,885,000 to \$1,658,325,000
E	\$1,452,748,000	\$0	\$651,834,000	\$2,104,582,000	\$1,490,610,000	\$1,043,427,000 to \$2,235,915,000
F	\$2,388,798,000	\$0	\$803,150,000	\$3,191,948,000	\$2,053,600,000	\$1,437,520,000 to \$3,080,400,000
G	\$3,355,667,000	\$0	\$977,724,000	\$4,333,391,000	\$2,446,450,000	\$1,712,515,000 to \$3,669,675,000

**Notes:**

- 1 - Capital costs, annual costs, and periodic costs are presented on Tables CS-A through CS-G. Capital costs are based on Disposed Material Management (DMM) Scenario 2.
- 2 - Estimated remedial timeframes and associated present value analysis for each remedial alternative are provided on Tables PV-A through PV-G.
- 3 - The non-discounted total cost demonstrates the impact of a discount rate on the total present value cost and the relative amount of future annual expenditures. Non-discounted costs are presented for comparison purposes only and should not be used in place of present value costs in the CERCLA remedy selection process.
- 4 - Costs presented for this alternative are expected to have an accuracy between -30% to +50% of actual costs, based on the scope presented. They are prepared solely to facilitate relative comparisons between alternatives for feasibility study level evaluation purposes.

**Exhibit CS-ALT**  
**Alternative Cost Estimate Accuracy Ranges**



**Remedial Alternatives  
Cost Summary**

**Present Value Analysis and Detailed Cost Estimate Summary  
Alternative A**

TABLE PV-A									
PRESENT VALUE ANALYSIS									
Alternative A									
Site: Portland Harbor Superfund Site Location: Portland, Oregon Phase: Draft Feasibility Study (-30% to +50%) Base Year: 2015									
Year <sup>1</sup>	Capital Costs (Institutional Controls) <sup>2</sup>	Capital Costs (Monitored Natural Recovery) <sup>2</sup>	Capital Costs (Technology Assignments) <sup>2</sup>	Periodic Costs (Long Term Monitoring and Monitored Natural Recovery)	Periodic Costs (Institutional Controls)	Periodic Costs (Five-Year Site Reviews)	Total Annual Expenditure <sup>3</sup>	Discount Factor (7.0%)	Present Value <sup>4</sup>
0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	1.0000	\$0
1	\$0	\$0	\$0	\$0	\$0	\$0	\$0	0.9346	\$0
2	\$0	\$0	\$0	\$0	\$0	\$0	\$0	0.8734	\$0
3	\$0	\$0	\$0	\$0	\$0	\$0	\$0	0.8163	\$0
4	\$0	\$0	\$0	\$0	\$0	\$0	\$0	0.7629	\$0
5	\$0	\$0	\$0	\$0	\$0	\$0	\$0	0.7130	\$0
6	\$0	\$0	\$0	\$0	\$0	\$0	\$0	0.6663	\$0
7	\$0	\$0	\$0	\$0	\$0	\$0	\$0	0.6227	\$0
8	\$0	\$0	\$0	\$0	\$0	\$0	\$0	0.5820	\$0
9	\$0	\$0	\$0	\$0	\$0	\$0	\$0	0.5439	\$0
10	\$0	\$0	\$0	\$0	\$0	\$0	\$0	0.5083	\$0
11	\$0	\$0	\$0	\$0	\$0	\$0	\$0	0.4751	\$0
12	\$0	\$0	\$0	\$0	\$0	\$0	\$0	0.4440	\$0
13	\$0	\$0	\$0	\$0	\$0	\$0	\$0	0.4150	\$0
14	\$0	\$0	\$0	\$0	\$0	\$0	\$0	0.3878	\$0
15	\$0	\$0	\$0	\$0	\$0	\$0	\$0	0.3624	\$0
16	\$0	\$0	\$0	\$0	\$0	\$0	\$0	0.3387	\$0
17	\$0	\$0	\$0	\$0	\$0	\$0	\$0	0.3166	\$0
18	\$0	\$0	\$0	\$0	\$0	\$0	\$0	0.2959	\$0
19	\$0	\$0	\$0	\$0	\$0	\$0	\$0	0.2765	\$0
20	\$0	\$0	\$0	\$0	\$0	\$0	\$0	0.2584	\$0
21	\$0	\$0	\$0	\$0	\$0	\$0	\$0	0.2415	\$0
22	\$0	\$0	\$0	\$0	\$0	\$0	\$0	0.2257	\$0
23	\$0	\$0	\$0	\$0	\$0	\$0	\$0	0.2109	\$0
24	\$0	\$0	\$0	\$0	\$0	\$0	\$0	0.1971	\$0
25	\$0	\$0	\$0	\$0	\$0	\$0	\$0	0.1842	\$0
26	\$0	\$0	\$0	\$0	\$0	\$0	\$0	0.1722	\$0
27	\$0	\$0	\$0	\$0	\$0	\$0	\$0	0.1609	\$0
28	\$0	\$0	\$0	\$0	\$0	\$0	\$0	0.1504	\$0
29	\$0	\$0	\$0	\$0	\$0	\$0	\$0	0.1406	\$0
30	\$0	\$0	\$0	\$0	\$0	\$0	\$0	0.1314	\$0
TOTALS:	\$0	\$0	\$0	\$0	\$0	\$0	\$0		\$0
TOTAL PRESENT VALUE OF ALTERNATIVE A <sup>5</sup>									\$0

**Notes:**

<sup>1</sup> The alternative is expected to require cost expenditures for perpetuity since contamination within the sediment bed and associated riverbank soils would remain in-place that do not allow for unrestricted use or unlimited exposure to human or ecological receptors. However the period of analysis was assumed to be 30 yrs beyond the construction in Year 0.

<sup>2</sup> Capital costs, for purposes of this analysis, are assumed to be distributed as indicated on Table CS-A.

<sup>3</sup> Total annual expenditure is the total cost per year with no discounting.

<sup>4</sup> Present value is the total cost per year including a 7.0% discount factor for that year. See Table PV-ADRFT for details.

<sup>5</sup> Total present value is rounded to the nearest \$10,000. Inflation and depreciation are excluded from the present value cost.

Costs presented for this alternative are expected to have an accuracy between -30% to +50% of actual costs, based on the scope presented.

They are prepared solely to facilitate relative comparisons between alternatives for FS evaluation purposes.



TABLE CS-A

Alternative A		DETAILED COST ESTIMATE SUMMARY	
<b>Site:</b>	Portland Harbor Superfund Site	<b>Description:</b>	The No Action Alternative does not include any dredging, capping, disposal, or treatment of contaminated sediments beyond the early actions that took place at the Gasco and Terminal 4 sites in 2005 and 2008, respectively. The Oregon Health Authority (OHA) would be expected to continue the fish consumption advisories already in place under State legal authorities, but the No Action Alternative does not include implementation of any new ICs or monitoring as a part of a CERCLA action for the Site.
<b>Location:</b>	Portland, Oregon		
<b>Phase:</b>	Draft Feasibility Study (-30% to +50%)		
<b>Base Year:</b>	2015		
<b>Date:</b>	8/12/2015		
<b>CAPITAL COSTS:</b>			
<b>TOTAL CAPITAL COST</b>		<b>\$0</b>	No capital costs are included for No Further Action alternative.
<b>ANNUAL O&amp;M COSTS:</b>			
<b>TOTAL ANNUAL O&amp;M COST</b>		<b>\$0</b>	No annual O&M costs are included for No Further Action alternative.
<b>PERIODIC COSTS</b>			
<b>TOTAL PERIODIC COST</b>		<b>\$0</b>	No periodic costs are included for No Further Action alternative.

**Notes:**

Percentages used for contingency and professional/technical services costs are based on guidance from Section 5.0 of "A Guide to Developing and Documenting Cost Estimates During the Feasibility Study", EPA 2000. Modifications to the percentages applied for contingency and professional/technical services are documented in Attachment A. Costs presented for this alternative are expected to have an accuracy between -30% to +50% of actual costs, based on the scope presented. They are prepared solely to facilitate relative comparisons between alternatives for FS evaluation purposes.

**Abbreviations:**

AC Acre  
CY Cubic Yard  
LS Lump Sum  
QTY Quantity  
TON Ton

**Present Value Analysis and Detailed Cost Estimate Summary  
Alternative B**

TABLE PV-B

## PRESENT VALUE ANALYSIS

Alternative B

Site: Portland Harbor Superfund Site  
 Location: Portland, Oregon  
 Phase: Draft Feasibility Study (-30% to +50%)  
 Base Year: 2015

Year <sup>1</sup>	Capital Costs (Institutional Controls) <sup>2</sup>	Capital Costs (Monitored Natural Recovery) <sup>2</sup>	Capital Costs (Technology Assignments) <sup>2</sup>	Annual O&M Costs	Periodic Costs (Long Term Monitoring and Monitored Natural Recovery)	Periodic Costs (Long Term Operations and Maintenance and Institutional Controls)	Periodic Costs (Five-Year Site Reviews)	Total Annual Expenditure <sup>3</sup>	Discount Factor (7.0%)	Present Value <sup>4</sup>
0	\$464,750	\$13,195,000	\$172,213,000	\$0	\$0	\$0	\$0	\$185,872,750	1.0000	\$185,872,750
1	\$464,750	\$0	\$172,213,000	\$0	\$0	\$0	\$0	\$172,677,750	0.9346	\$161,384,625
2	\$464,750	\$0	\$172,213,000	\$0	\$30,166,000	\$0	\$0	\$202,843,750	0.8734	\$177,163,731
3	\$464,750	\$0	\$172,213,000	\$0	\$0	\$0	\$0	\$172,677,750	0.8163	\$140,956,847
4	\$0	\$0	\$0	\$0	\$30,166,000	\$0	\$0	\$30,166,000	0.7629	\$23,013,641
5	\$0	\$0	\$0	\$0	\$0	\$5,669,000	\$308,000	\$5,977,000	0.7130	\$4,261,601
6	\$0	\$0	\$0	\$0	\$30,166,000	\$0	\$0	\$30,166,000	0.6663	\$20,099,606
7	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	0.6227	\$0
8	\$0	\$0	\$0	\$0	\$30,166,000	\$0	\$0	\$30,166,000	0.5820	\$17,556,612
9	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	0.5439	\$0
10	\$0	\$0	\$0	\$0	\$30,166,000	\$5,669,000	\$308,000	\$36,143,000	0.5083	\$18,371,487
11	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	0.4751	\$0
12	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	0.4440	\$0
13	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	0.4150	\$0
14	\$0	\$0	\$0	\$0	\$30,166,000	\$0	\$0	\$30,166,000	0.3878	\$11,698,375
15	\$0	\$0	\$0	\$0	\$0	\$5,669,000	\$308,000	\$5,977,000	0.3624	\$2,166,065
16	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	0.3387	\$0
17	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	0.3166	\$0
18	\$0	\$0	\$0	\$0	\$30,166,000	\$0	\$0	\$30,166,000	0.2959	\$8,926,119
19	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	0.2765	\$0
20	\$0	\$0	\$0	\$0	\$0	\$5,669,000	\$308,000	\$5,977,000	0.2584	\$1,544,457
21	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	0.2415	\$0
22	\$0	\$0	\$0	\$0	\$30,166,000	\$0	\$0	\$30,166,000	0.2257	\$6,808,466
23	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	0.2109	\$0
24	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	0.1971	\$0
25	\$0	\$0	\$0	\$0	\$0	\$5,669,000	\$308,000	\$5,977,000	0.1842	\$1,100,963
26	\$0	\$0	\$0	\$0	\$30,166,000	\$0	\$0	\$30,166,000	0.1722	\$5,194,585
27	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	0.1609	\$0
28	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	0.1504	\$0
29	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	0.1406	\$0
30	\$0	\$0	\$0	\$0	\$30,166,000	\$5,669,000	\$308,000	\$36,143,000	0.1314	\$4,749,190
<b>TOTALS:</b>	\$1,859,000	\$13,195,000	\$688,852,000	\$0	\$301,660,000	\$34,014,000	\$1,848,000	\$1,041,428,000		\$790,869,120
<b>TOTAL PRESENT VALUE OF ALTERNATIVE B<sup>5</sup></b>										<b>\$790,870,000</b>

**Notes:**

<sup>1</sup> The alternative is expected to require cost expenditures for perpetuity since some contamination within the sediment bed and associated riverbank soils would remain in-place that do not allow for unrestricted use or unlimited exposure to human or ecological receptors. However the period of analysis was assumed to be 30 yrs beyond the construction in Year 0.

<sup>2</sup> Capital costs, for purposes of this analysis, are assumed to be distributed as indicated on Table CS-B.

<sup>3</sup> Total annual expenditure is the total cost per year with no discounting.

<sup>4</sup> Present value is the total cost per year including a 7.0% discount factor for that year. See Table PV-ADRFT for details.

<sup>5</sup> Total present value is rounded to the nearest \$10,000. Inflation and depreciation are excluded from the present value cost.

Costs presented for this alternative are expected to have an accuracy between -30% to +50% of actual costs, based on the scope presented.

They are prepared solely to facilitate relative comparisons between alternatives for FS evaluation purposes.

TABLE CS-B

TABLE CS-B						
Alternative B		DETAILED COST ESTIMATE SUMMARY				
<b>Site:</b>	Portland Harbor Superfund Site	<b>Description:</b> This alternative evaluates a remedy that would involve dredging of contaminated sediments, disposal of contaminated sediment at offsite facilities (Subtitle D and Subtitle C/TSCA), capping, enhanced monitored natural recovery (EMNR), in-situ treatment, and monitored natural recovery (MNR).Capital costs are based on Disposed Material Management (DMM) Scenario 2.				
<b>Location:</b>	Portland, Oregon					
<b>Phase:</b>	Draft Feasibility Study (-30% to +50%)					
<b>Base Year:</b>	2015					
<b>Date:</b>	8/12/2015					
INSTITUTIONAL CONTROLS CAPITAL COSTS: (Assumed to be Incurred During Years 0 through 3)						
DESCRIPTION	WORKSHEET	QTY	UNIT(S)	UNIT COST	TOTAL	NOTES
Institutional Controls	CW-B2	1	LS	\$1,579,220	\$1,579,220	
SUBTOTAL					\$1,579,220	
Contingency (Scope and Bid)		10%			\$157,922	10% Scope, 0% Bid as documented in Attachment A.
SUBTOTAL					\$1,737,142	
Project Management		2%			\$34,743	Percentage modified as documented in Attachment A.
Remedial Design		2%			\$34,743	Percentage modified as documented in Attachment A.
Construction Management		3%			\$52,114	Percentage modified as documented in Attachment A.
TOTAL					\$1,858,742	
TOTAL CAPITAL COST					\$1,859,000	Total capital cost is rounded to the nearest \$1,000.
MONITORED NATURAL RECOVERY CAPITAL COSTS: (Assumed to be Incurred During Year 0)						
DESCRIPTION	WORKSHEET	QTY	UNIT(S)	UNIT COST	TOTAL	NOTES
Monitored Natural Recovery (MNR) for MNR/Enhanced Monitored Natural Recovery (EMNR) and Broadcast GAC Areas	CW-B22	1	LS	\$9,398,171	\$9,398,171	Quantity represents dredge, MNR/EMNR and in situ treatment areas.
SUBTOTAL					\$9,398,171	
Contingency (Scope and Bid)		20%			\$1,879,634	10% Scope, 10% Bid (Low end of the recommended range in EPA 540-R-00-002).
SUBTOTAL					\$11,277,805	
Project Management		5%			\$563,890	Percentage from Exhibit 5-8 in EPA 540-R-00-002 was used.
Remedial Design		6%			\$676,668	Percentage from Exhibit 5-8 in EPA 540-R-00-002 was used.
Construction Management		6%			\$676,668	Percentage from Exhibit 5-8 in EPA 540-R-00-002 was used.
TOTAL					\$13,195,031	
TOTAL CAPITAL COST					\$13,195,000	Total capital cost is rounded to the nearest \$1,000.

TABLE CS-B

Alternative B		DETAILED COST ESTIMATE SUMMARY				
<b>Site:</b>	Portland Harbor Superfund Site	<b>Description:</b>	This alternative evaluates a remedy that would involve dredging of contaminated sediments, disposal of contaminated sediment at offsite facilities (Subtitle D and Subtitle C/TSCA), capping, enhanced monitored natural recovery (EMNR), in-situ treatment, and monitored natural recovery (MNR).Capital costs are based on Disposed Material Management (DMM) Scenario 2.			
<b>Location:</b>	Portland, Oregon					
<b>Phase:</b>	Draft Feasibility Study (-30% to +50%)					
<b>Base Year:</b>	2015					
<b>Date:</b>	8/12/2015					
TECHNOLOGY ASSIGNMENTS MEASURES CAPITAL CONSTRUCTION COSTS: (Assumed to be Incurred During Years 0 through 3)						
DESCRIPTION	WORKSHEET	QTY	UNIT(S)	UNIT COST	TOTAL	NOTES
Mobilization / Demobilization	CW-B1	1	LS	\$8,449,000	\$8,449,000	
Transload Facility Development	CW-B21	1	LS	\$11,891,250	\$11,891,250	
Debris Removal and Disposal	CW-B5	200	AC	\$13,084	\$2,615,442	
Obstruction Removal and Relocation	CW-B6	1	LS	\$3,501,916	\$3,501,916	
Erosion/Residual Control Measures	CW-B7	1	LS	\$22,280,625	\$22,280,625	
Dredging of Contaminated Sediments (Open Water)	CW-B8	571,534	CY	\$38	\$21,732,580	
Dredging of Contaminated Sediments (Confined)	CW-B9	144,946	CY	\$54	\$7,778,165	
Excavation of Contaminated Sediments (From Shore for Riverbanks)	CW-B10	52,758	CY	\$47	\$2,469,074	
Hydraulic Offloading of the Contaminated Sediments	CW-B11	769,238	CY	\$6	\$4,846,199	Includes offloading contaminated sediments the transload facility (for Subtitle C/TSCA or Subtitle D disposal).
Subtitle C/TSCA Disposal (Handling, Transportation, Treatment of Select PTW Materials, and Disposal)	CW-B12	290,921	CY	\$949	\$275,987,108	Includes waste going to offsite Subtitle C/TSCA facility for disposal, including the volume of NRC/NAPL PTW that would require treatment.
Subtitle D Disposal (Handling, Transportation, and Disposal)	CW-B13	478,317	CY	\$138	\$65,985,802	Includes waste going to offsite Subtitle D facility for disposal without treatment, including the volume of "concentration"-based PTW (such as DDX and non-TSCA PCBs).
Mitigation	CW-B14	14	AC	\$2,296,835	\$32,155,684	
Sand Placement for Technology Assignments	CW-B15	277,150	CY	\$50	\$13,781,260	
Beach Mix Placement for Technology Assignments	CW-B16	14,811	CY	\$100	\$1,485,147	
Armor Placement for Technology Assignments	CW-B17	21,987	CY	\$104	\$2,277,340	
Reactive/GAC Placement for Technology Assignments	CW-B18	5,764	TON	\$8,882	\$51,197,471	
Geofabric for Riverbanks	CW-B19	11	AC	\$13,894	\$152,829	
Organoclay Mat Placement for Technology Assignments	CW-B20	16	AC	\$493,909	\$7,902,546	
SUBTOTAL					\$536,489,438	
Contingency (Scope and Bid)		20%			\$107,297,888	10% Scope, 10% Bid (Low end of the recommended range in EPA 540-R-00-002).
SUBTOTAL					\$643,787,326	
Project Management		2%			\$12,875,747	Percentage modified as documented in Attachment A.
Remedial Design		2%			\$12,875,747	Percentage modified as documented in Attachment A.
Construction Management		3%			\$19,313,620	Percentage modified as documented in Attachment A.
TOTAL					\$688,852,440	
TOTAL CAPITAL COST					\$688,852,000	Total capital cost is rounded to the nearest \$1,000.

TABLE CS-B

TABLE CS-B						
Alternative	B					
DETAILED COST ESTIMATE SUMMARY						
<b>Site:</b>	Portland Harbor Superfund Site	<b>Description:</b>	This alternative evaluates a remedy that would involve dredging of contaminated sediments, disposal of contaminated sediment at offsite facilities (Subtitle D and Subtitle C/TSCA), capping, enhanced monitored natural recovery (EMNR), in-situ treatment, and monitored natural recovery (MNR).Capital costs are based on Disposed Material Management (DMM) Scenario 2.			
<b>Location:</b>	Portland, Oregon					
<b>Phase:</b>	Draft Feasibility Study (-30% to +50%)					
<b>Base Year:</b>	2015					
<b>Date:</b>	8/12/2015					
SITE-WIDE MONITORING AND MONITORED NATURAL RECOVERY PERIODIC COSTS: (Assumed to be Incurred at Years 2, 4, 6, 8, 10 and Every 4 Years through Period of Analysis)						
<b>DESCRIPTION</b>	<b>WORKSHEET</b>	<b>QTY</b>	<b>UNIT(S)</b>	<b>UNIT COST</b>	<b>TOTAL</b>	<b>NOTES</b>
Monitored Natural Recovery (MNR) for MNR/Enhanced Monitored Natural Recovery (EMNR) and Broadcast GAC Areas	CW-B22	1	LS	\$9,398,171	\$9,398,171	
Site-Wide Monitoring	CW-B23	1	LS	\$955,960	\$955,960	
Cap Area Monitoring and Reactive Layer Monitoring	CW-B24	1	LS	\$13,140,017	\$13,140,017	
<b>SUBTOTAL</b>					\$23,494,148	
Contingency (Scope and Bid)		20%			\$4,698,830	10% Scope, 10% Bid (Low end of the recommended range in EPA 540-R-00-002).
<b>SUBTOTAL</b>					\$28,192,978	
Project Management		2%			\$563,860	Percentage modified as documented in Attachment A.
Technical Support		5%			\$1,409,649	Percentage modified as documented in Attachment A.
<b>TOTAL</b>					\$30,166,487	
<b>TOTAL PERIODIC COST</b>					\$30,166,000	Total periodic cost is rounded to the nearest \$1,000.
LONG TERM OPERATIONS AND MAINTENANCE PERIODIC COSTS: (Assumed to be Incurred at Year 5 and Every 5 Years through Period of Analysis)						
<b>DESCRIPTION</b>	<b>WORKSHEET</b>	<b>QTY</b>	<b>UNIT(S)</b>	<b>UNIT COST</b>	<b>TOTAL</b>	<b>NOTES</b>
Long-Term Maintenance for Capping, EMNR, and In Situ Treatment	CW-B25	1	LS	\$3,908,170	\$3,908,170	Assume 5% of placement of additional material for capping, EMNR and In Situ Treatment. Includes mobilization and demobilization costs.
<b>SUBTOTAL</b>					\$3,908,170	
Contingency (Scope and Bid)		20%			\$781,634	10% Scope, 10% Bid (Low end of the recommended range in EPA 540-R-00-002).
<b>SUBTOTAL</b>					\$4,689,804	
Project Management		5%			\$234,490	Low end of the recommended range in EPA 540-R-00-002 was used.
Technical Support		10%			\$468,980	Low end of the recommended range in EPA 540-R-00-002 was used.
<b>TOTAL</b>					\$5,393,274	
<b>TOTAL PERIODIC COST</b>					\$5,393,000	Total periodic cost is rounded to the nearest \$1,000.

TABLE CS-B

TABLE CS-B						
Alternative	B					
DETAILED COST ESTIMATE SUMMARY						
Site:	Portland Harbor Superfund Site	Description:	This alternative evaluates a remedy that would involve dredging of contaminated sediments, disposal of contaminated sediment at offsite facilities (Subtitle D and Subtitle C/TSCA), capping, enhanced monitored natural recovery (EMNR), in-situ treatment, and monitored natural recovery (MNR).Capital costs are based on Disposed Material Management (DMM) Scenario 2.			
Location:	Portland, Oregon					
Phase:	Draft Feasibility Study (-30% to +50%)					
Base Year:	2015					
Date:	8/12/2015					
INSTITUTIONAL CONTROLS PERIODIC COSTS: (Assumed to be Incurred at Year 5 and Every 5 Years through Period of Analysis)						
DESCRIPTION	WORKSHEET	QTY	UNIT(S)	UNIT COST	TOTAL	NOTES
Evaluating and Updating Institutional Controls	CW-B3	1	LS	\$218,260	\$218,260	
SUBTOTAL					\$218,260	
Contingency (Scope and Bid)		10%			\$21,826	10% Scope, 0% Bid as documented in Attachment A.
SUBTOTAL					\$240,086	
Project Management		5%			\$12,004	Low end of the recommended range in EPA 540-R-00-002 was used.
Technical Support		10%			\$24,009	Low end of the recommended range in EPA 540-R-00-002 was used.
TOTAL					\$276,099	
TOTAL PERIODIC COST					\$276,000	Total periodic cost is rounded to the nearest \$1,000.
5-YEAR SITE REVIEW PERIODIC COSTS: (Assumed to be Incurred at Year 5 and Every 5 Years through Period of Analysis)						
DESCRIPTION	WORKSHEET	QTY	UNIT(S)	UNIT COST	TOTAL	NOTES
5-Year Site Review	CW-B26	1	LS	\$243,666	\$243,666	
SUBTOTAL					\$243,666	
Contingency (Scope and Bid)		10%			\$24,367	10% Scope, 0% Bid as documented in Attachment A.
SUBTOTAL					\$268,033	
Project Management		5%			\$13,402	Low end of the recommended range in EPA 540-R-00-002 was used.
Technical Support		10%			\$26,803	Low end of the recommended range in EPA 540-R-00-002 was used.
TOTAL					\$308,238	
TOTAL PERIODIC COST					\$308,000	Total periodic cost is rounded to the nearest \$1,000.

**Notes:**

Percentages used for contingency and professional/technical services costs are based on guidance from Section 5.0 of "A Guide to Developing and Documenting Cost Estimates During the Feasibility Study", EPA 2000. Modifications to the percentages applied for contingency and professional/technical services are documented in Attachment A.

Costs presented for this alternative are expected to have an accuracy between -30% to +50% of actual costs, based on the scope presented. They are prepared solely to facilitate relative comparisons between alternatives for FS evaluation purposes.

**Abbreviations:**

AC	Acre
CY	Cubic Yard
LS	Lump Sum
QTY	Quantity
TON	Ton

**Present Value Analysis and Detailed Cost Estimate Summary  
Alternative D**



TABLE PV-D

## PRESENT VALUE ANALYSIS

Alternative D

Site: Portland Harbor Superfund Site  
 Location: Portland, Oregon  
 Phase: Draft Feasibility Study (-30% to +50%)  
 Base Year: 2015

Year <sup>1</sup>	Capital Costs (Institutional Controls) <sup>2</sup>	Capital Costs (Monitored Natural Recovery) <sup>2</sup>	Capital Costs (Technology Assignments) <sup>2</sup>	Annual O&M Costs	Periodic Costs (Long Term Monitoring and Monitored Natural Recovery)	Periodic Costs (Long Term Operations and Maintenance and Institutional Controls)	Periodic Costs (Five-Year Site Reviews)	Total Annual Expenditure <sup>3</sup>	Discount Factor (7.0%)	Present Value <sup>4</sup>
0	\$371,800	\$12,766,000	\$201,675,800	\$0	\$0	\$0	\$0	\$214,813,600	1.0000	\$214,813,600
1	\$371,800	\$0	\$201,675,800	\$0	\$0	\$0	\$0	\$202,047,600	0.9346	\$188,833,687
2	\$371,800	\$0	\$201,675,800	\$0	\$40,482,000	\$0	\$0	\$242,529,600	0.8734	\$211,825,353
3	\$371,800	\$0	\$201,675,800	\$0	\$0	\$0	\$0	\$202,047,600	0.8163	\$164,931,456
4	\$371,800	\$0	\$201,675,800	\$0	\$40,482,000	\$0	\$0	\$242,529,600	0.7629	\$185,025,832
5	\$0	\$0	\$0	\$0	\$0	\$8,917,000	\$308,000	\$9,225,000	0.7130	\$6,577,425
6	\$0	\$0	\$0	\$0	\$40,482,000	\$0	\$0	\$40,482,000	0.6663	\$26,973,157
7	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	0.6227	\$0
8	\$0	\$0	\$0	\$0	\$40,482,000	\$0	\$0	\$40,482,000	0.5820	\$23,560,524
9	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	0.5439	\$0
10	\$0	\$0	\$0	\$0	\$40,482,000	\$8,917,000	\$308,000	\$49,707,000	0.5083	\$25,266,068
11	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	0.4751	\$0
12	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	0.4440	\$0
13	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	0.4150	\$0
14	\$0	\$0	\$0	\$0	\$40,482,000	\$0	\$0	\$40,482,000	0.3878	\$15,698,920
15	\$0	\$0	\$0	\$0	\$0	\$8,917,000	\$308,000	\$9,225,000	0.3624	\$3,343,140
16	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	0.3387	\$0
17	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	0.3166	\$0
18	\$0	\$0	\$0	\$0	\$40,482,000	\$0	\$0	\$40,482,000	0.2959	\$11,978,624
19	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	0.2765	\$0
20	\$0	\$0	\$0	\$0	\$0	\$8,917,000	\$308,000	\$9,225,000	0.2584	\$2,383,740
21	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	0.2415	\$0
22	\$0	\$0	\$0	\$0	\$40,482,000	\$0	\$0	\$40,482,000	0.2257	\$9,136,787
23	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	0.2109	\$0
24	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	0.1971	\$0
25	\$0	\$0	\$0	\$0	\$0	\$8,917,000	\$308,000	\$9,225,000	0.1842	\$1,699,245
26	\$0	\$0	\$0	\$0	\$40,482,000	\$0	\$0	\$40,482,000	0.1722	\$6,971,000
27	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	0.1609	\$0
28	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	0.1504	\$0
29	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	0.1406	\$0
30	\$0	\$0	\$0	\$0	\$40,482,000	\$8,917,000	\$308,000	\$49,707,000	0.1314	\$6,531,500
<b>TOTALS:</b>	\$1,859,000	\$12,766,000	\$1,008,379,000	\$0	\$404,820,000	\$53,502,000	\$1,848,000	\$1,483,174,000		\$1,105,550,058
<b>TOTAL PRESENT VALUE OF ALTERNATIVE D<sup>5</sup></b>										<b>\$1,105,550,000</b>

**Notes:**

<sup>1</sup> The alternative is expected to require cost expenditures for perpetuity since some contamination within the sediment bed and associated riverbank soils would remain in-place that do not allow for unrestricted use or unlimited exposure to human or ecological receptors. However the period of analysis was assumed to be 30 yrs beyond the construction in Year 0.

<sup>2</sup> Capital costs, for purposes of this analysis, are assumed to be distributed as indicated on Table CS-D.

<sup>3</sup> Total annual expenditure is the total cost per year with no discounting.

<sup>4</sup> Present value is the total cost per year including a 7.0% discount factor for that year. See Table PV-ADRFT for details.

<sup>5</sup> Total present value is rounded to the nearest \$10,000. Inflation and depreciation are excluded from the present value cost.

Costs presented for this alternative are expected to have an accuracy between -30% to +50% of actual costs, based on the scope presented.

They are prepared solely to facilitate relative comparisons between alternatives for FS evaluation purposes.

TABLE CS-D

TABLE CS-D						
Alternative D		DETAILED COST ESTIMATE SUMMARY				
<b>Site:</b>	Portland Harbor Superfund Site	<b>Description:</b>	This alternative evaluates a remedy that would involve dredging of contaminated sediments, disposal of contaminated sediment at offsite facilities (Subtitle D and Subtitle C/TSCA), capping, enhanced monitored natural recovery (EMNR), in-situ treatment, and monitored natural recovery (MNR). Capital costs are based on Disposed Material Management (DMM) Scenario 2.			
<b>Location:</b>	Portland, Oregon					
<b>Phase:</b>	Draft Feasibility Study (-30% to +50%)					
<b>Base Year:</b>	2015					
<b>Date:</b>	8/12/2015					
INSTITUTIONAL CONTROLS CAPITAL COSTS: (Assumed to be Incurred During Years 0 through 4)						
<b>DESCRIPTION</b>	<b>WORKSHEET</b>	<b>QTY</b>	<b>UNIT(S)</b>	<b>UNIT COST</b>	<b>TOTAL</b>	<b>NOTES</b>
Institutional Controls	CW-D2	1	LS	\$1,579,220	\$1,579,220	
<b>SUBTOTAL</b>					\$1,579,220	
Contingency (Scope and Bid)		10%			\$157,922	10% Scope, 0% Bid as documented in Attachment A.
<b>SUBTOTAL</b>					\$1,737,142	
Project Management		2%			\$34,743	Percentage modified as documented in Attachment A.
Remedial Design		2%			\$34,743	Percentage modified as documented in Attachment A.
Construction Management		3%			\$52,114	Percentage modified as documented in Attachment A.
<b>TOTAL</b>					\$1,858,742	
<b>TOTAL CAPITAL COST</b>					<b>\$1,859,000</b>	Total capital cost is rounded to the nearest \$1,000.
MONITORED NATURAL RECOVERY CAPITAL COSTS: (Assumed to be Incurred During Year 0)						
<b>DESCRIPTION</b>	<b>WORKSHEET</b>	<b>QTY</b>	<b>UNIT(S)</b>	<b>UNIT COST</b>	<b>TOTAL</b>	<b>NOTES</b>
Monitored Natural Recovery (MNR) for MNR/Enhanced Monitored Natural Recovery (EMNR) and Broadcast GAC Areas	CW-D22	2,471	AC	\$3,680	\$9,092,749	Quantity represents dredge, MNR/EMNR and in situ treatment areas.
<b>SUBTOTAL</b>					\$9,092,749	
Contingency (Scope and Bid)		20%			\$1,818,550	10% Scope, 10% Bid (Low end of the recommended range in EPA 540-R-00-002).
<b>SUBTOTAL</b>					\$10,911,299	
Project Management		5%			\$545,565	Percentage from Exhibit 5-8 in EPA 540-R-00-002 was used.
Remedial Design		6%			\$654,678	Percentage from Exhibit 5-8 in EPA 540-R-00-002 was used.
Construction Management		6%			\$654,678	Percentage from Exhibit 5-8 in EPA 540-R-00-002 was used.
<b>TOTAL</b>					\$12,766,220	
<b>TOTAL CAPITAL COST</b>					<b>\$12,766,000</b>	Total capital cost is rounded to the nearest \$1,000.

TABLE CS-D

TABLE CS-D						
Alternative D		DETAILED COST ESTIMATE SUMMARY				
<b>Site:</b>	Portland Harbor Superfund Site	<b>Description:</b>	This alternative evaluates a remedy that would involve dredging of contaminated sediments, disposal of contaminated sediment at offsite facilities (Subtitle D and Subtitle C/TSCA), capping, enhanced monitored natural recovery (EMNR), in-situ treatment, and monitored natural recovery (MNR). Capital costs are based on Disposed Material Management (DMM) Scenario 2.			
<b>Location:</b>	Portland, Oregon					
<b>Phase:</b>	Draft Feasibility Study (-30% to +50%)					
<b>Base Year:</b>	2015					
<b>Date:</b>	8/12/2015					
TECHNOLOGY ASSIGNMENTS MEASURES CAPITAL CONSTRUCTION COSTS: (Assumed to be Incurred During Years 0 through 4)						
DESCRIPTION	WORKSHEET	QTY	UNIT(S)	UNIT COST	TOTAL	NOTES
Mobilization / Demobilization	CW-D1	1	LS	\$12,368,000	\$12,368,000	
Transload Facility Development	CW-D21	1	LS	\$12,743,438	\$12,743,438	
Debris Removal and Disposal	CW-D5	265	AC	\$13,084	\$3,462,959	
Obstruction Removal and Relocation	CW-D6	1	LS	\$7,528,576	\$7,528,576	
Erosion/Residual Control Measures	CW-D7	1	LS	\$23,490,000	\$23,490,000	
Dredging of Contaminated Sediments (Open Water)	CW-D8	1,137,009	CY	\$38	\$43,234,767	
Dredging of Contaminated Sediments (Confined)	CW-D9	231,402	CY	\$54	\$12,417,610	
Excavation of Contaminated Sediments (From Shore for Riverbanks)	CW-D10	72,643	CY	\$47	\$3,399,692	
Hydraulic Offloading of the Contaminated Sediments	CW-D11	1,441,054	CY	\$6	\$9,078,640	Includes offloading contaminated sediments the transload facility (for Subtitle C/TSCA or Subtitle D disposal).
Subtitle C/TSCA Disposal (Handling, Transportation, Treatment of Select PTW Materials, and Disposal)	CW-D12	355,633	CY	\$949	\$337,377,202	Includes waste going to offsite Subtitle C/TSCA facility for disposal, including the volume of NRC/NAPL PTW that would require treatment.
Subtitle D Disposal (Handling, Transportation, and Disposal)	CW-D13	1,085,421	CY	\$130	\$140,565,035	Includes waste going to offsite Subtitle D facility for disposal without treatment, including the volume of "concentration"-based PTW (such as DDx and non-TSCA PCBs).
Mitigation	CW-D14	27	AC	\$2,373,209	\$64,076,656	
Sand Placement for Technology Assignments	CW-D15	505,256	CY	\$49	\$24,592,166	
Beach Mix Placement for Technology Assignments	CW-D16	24,919	CY	\$98	\$2,441,604	
Armor Placement for Technology Assignments	CW-D17	43,903	CY	\$99	\$4,354,613	
Reactive/GAC Placement for Technology Assignments	CW-D18	9,369	TON	\$8,161	\$76,461,209	
Geofabric for Riverbanks	CW-D19	15	AC	\$14,093	\$211,389	
Organoclay Mat Placement for Technology Assignments	CW-D20	18	AC	\$418,802	\$7,538,440	
SUBTOTAL					\$785,341,996	
Contingency (Scope and Bid)		20%			\$157,068,399	10% Scope, 10% Bid (Low end of the recommended range in EPA 540-R-00-002).
SUBTOTAL					\$942,410,395	
Project Management		2%			\$18,848,208	Percentage modified as documented in Attachment A.
Remedial Design		2%			\$18,848,208	Percentage modified as documented in Attachment A.
Construction Management		3%			\$28,272,312	Percentage modified as documented in Attachment A.
TOTAL					\$1,008,379,123	
TOTAL CAPITAL COST					\$1,008,379,000	Total capital cost is rounded to the nearest \$1,000.

TABLE CS-D

Alternative	D	DETAILED COST ESTIMATE SUMMARY				
<b>Site:</b>	Portland Harbor Superfund Site	<b>Description:</b> This alternative evaluates a remedy that would involve dredging of contaminated sediments, disposal of contaminated sediment at offsite facilities (Subtitle D and Subtitle C/TSCA), capping, enhanced monitored natural recovery (EMNR), in-situ treatment, and monitored natural recovery (MNR). Capital costs are based on Disposed Material Management (DMM) Scenario 2.				
<b>Location:</b>	Portland, Oregon					
<b>Phase:</b>	Draft Feasibility Study (-30% to +50%)					
<b>Base Year:</b>	2015					
<b>Date:</b>	8/12/2015					
<b>SITE-WIDE MONITORING AND MONITORED NATURAL RECOVERY PERIODIC COSTS: (Assumed to be Incurred at Years 2, 4, 6, 8, 10 and Every 4 Years through Period of Analysis)</b>						
<b>DESCRIPTION</b>	<b>WORKSHEET</b>	<b>QTY</b>	<b>UNIT(S)</b>	<b>UNIT COST</b>	<b>TOTAL</b>	<b>NOTES</b>
Monitored Natural Recovery (MNR) for MNR/Enhanced Monitored Natural Recovery (EMNR) and Broadcast GAC Areas	CW-D22	1	LS	\$9,092,749	\$9,092,749	
Site-Wide Monitoring	CW-D23	1	LS	\$955,960	\$955,960	
Cap Area Monitoring and Reactive Layer Monitoring	CW-D24	1	LS	\$21,479,336	\$21,479,336	
<b>SUBTOTAL</b>					\$31,528,045	
Contingency (Scope and Bid)		20%			\$6,305,609	10% Scope, 10% Bid (Low end of the recommended range in EPA 540-R-00-002).
<b>SUBTOTAL</b>					\$37,833,654	
Project Management		2%			\$756,673	Percentage modified as documented in Attachment A.
Technical Support		5%			\$1,891,683	Percentage modified as documented in Attachment A.
<b>TOTAL</b>					\$40,482,010	
<b>TOTAL PERIODIC COST</b>					<b>\$40,482,000</b>	Total periodic cost is rounded to the nearest \$1,000.
<b>LONG TERM OPERATIONS AND MAINTENANCE PERIODIC COSTS: (Assumed to be Incurred at Year 5 and Every 5 Years through Period of Analysis)</b>						
<b>DESCRIPTION</b>	<b>WORKSHEET</b>	<b>QTY</b>	<b>UNIT(S)</b>	<b>UNIT COST</b>	<b>TOTAL</b>	<b>NOTES</b>
Long-Term Maintenance for Capping, EMNR, and In Situ Treatment	CW-D25	1	LS	\$6,261,686	\$6,261,686	Assume 5% of placement of additional material for capping, EMNR and In Situ Treatment. Includes mobilization and demobilization costs.
<b>SUBTOTAL</b>					\$6,261,686	
Contingency (Scope and Bid)		20%			\$1,252,337	10% Scope, 10% Bid (Low end of the recommended range in EPA 540-R-00-002).
<b>SUBTOTAL</b>					\$7,514,023	
Project Management		5%			\$375,701	Low end of the recommended range in EPA 540-R-00-002 was used.
Technical Support		10%			\$751,402	Low end of the recommended range in EPA 540-R-00-002 was used.
<b>TOTAL</b>					\$8,641,126	
<b>TOTAL PERIODIC COST</b>					<b>\$8,641,000</b>	Total periodic cost is rounded to the nearest \$1,000.

TABLE CS-D

TABLE CS-D						
Alternative D		DETAILED COST ESTIMATE SUMMARY				
<b>Site:</b>	Portland Harbor Superfund Site	<b>Description:</b>	This alternative evaluates a remedy that would involve dredging of contaminated sediments, disposal of contaminated sediment at offsite facilities (Subtitle D and Subtitle C/TSCA), capping, enhanced monitored natural recovery (EMNR), in-situ treatment, and monitored natural recovery (MNR). Capital costs are based on Disposed Material Management (DMM) Scenario 2.			
<b>Location:</b>	Portland, Oregon					
<b>Phase:</b>	Draft Feasibility Study (-30% to +50%)					
<b>Base Year:</b>	2015					
<b>Date:</b>	8/12/2015					
INSTITUTIONAL CONTROLS PERIODIC COSTS: (Assumed to be Incurred at Year 5 and Every 5 Years through Period of Analysis)						
<b>DESCRIPTION</b>	<b>WORKSHEET</b>	<b>QTY</b>	<b>UNIT(S)</b>	<b>UNIT COST</b>	<b>TOTAL</b>	<b>NOTES</b>
Evaluating and Updating Institutional Controls	CW-D3	1	LS	\$218,260	\$218,260	
<b>SUBTOTAL</b>					\$218,260	
Contingency (Scope and Bid)		10%			\$21,826	10% Scope, 0% Bid as documented in Attachment A.
<b>SUBTOTAL</b>					\$240,086	
Project Management		5%			\$12,004	Low end of the recommended range in EPA 540-R-00-002 was used.
Technical Support		10%			\$24,009	Low end of the recommended range in EPA 540-R-00-002 was used.
<b>TOTAL</b>					\$276,099	
<b>TOTAL PERIODIC COST</b>					<b>\$276,000</b>	Total periodic cost is rounded to the nearest \$1,000.
5-YEAR SITE REVIEW PERIODIC COSTS: (Assumed to be Incurred at Year 5 and Every 5 Years through Period of Analysis)						
<b>DESCRIPTION</b>	<b>WORKSHEET</b>	<b>QTY</b>	<b>UNIT(S)</b>	<b>UNIT COST</b>	<b>TOTAL</b>	<b>NOTES</b>
5-Year Site Review	CW-D26	1	LS	\$243,666	\$243,666	
<b>SUBTOTAL</b>					\$243,666	
Contingency (Scope and Bid)		10%			\$24,367	10% Scope, 0% Bid as documented in Attachment A.
<b>SUBTOTAL</b>					\$268,033	
Project Management		5%			\$13,402	Low end of the recommended range in EPA 540-R-00-002 was used.
Technical Support		10%			\$26,803	Low end of the recommended range in EPA 540-R-00-002 was used.
<b>TOTAL</b>					\$308,238	
<b>TOTAL PERIODIC COST</b>					<b>\$308,000</b>	Total periodic cost is rounded to the nearest \$1,000.

**Notes:**

Percentages used for contingency and professional/technical services costs are based on guidance from Section 5.0 of "A Guide to Developing and Documenting Cost Estimates During the Feasibility Study", EPA 2000. Modifications to the percentages applied for contingency and professional/technical services are documented in Attachment A.

Costs presented for this alternative are expected to have an accuracy between -30% to +50% of actual costs, based on the scope presented. They are prepared solely to facilitate relative comparisons between alternatives for FS evaluation purposes.

**Abbreviations:**

AC Acre  
CY Cubic Yard  
LS Lump Sum  
QTY Quantity  
TON Ton

**Present Value Analysis and Detailed Cost Estimate Summary  
Alternative E**

TABLE PV-E

## PRESENT VALUE ANALYSIS

Alternative E

Site: Portland Harbor Superfund Site  
 Location: Portland, Oregon  
 Phase: Draft Feasibility Study (-30% to +50%)  
 Base Year: 2015

Year <sup>1</sup>	Capital Costs (Institutional Controls) <sup>2</sup>	Capital Costs (Monitored Natural Recovery) <sup>2</sup>	Capital Costs (Technology Assignments) <sup>2</sup>	Annual O&M Costs	Periodic Costs (Long Term Monitoring and Monitored Natural Recovery)	Periodic Costs (Long Term Operations and Maintenance and Institutional Controls)	Periodic Costs (Five-Year Site Reviews)	Total Annual Expenditure <sup>3</sup>	Discount Factor (7.0%)	Present Value <sup>4</sup>
0	\$265,571	\$12,270,000	\$205,517,000	\$0	\$0	\$0	\$0	\$218,052,571	1.0000	\$218,052,571
1	\$265,571	\$0	\$205,517,000	\$0	\$0	\$0	\$0	\$205,782,571	0.9346	\$192,324,391
2	\$265,571	\$0	\$205,517,000	\$0	\$56,733,000	\$0	\$0	\$262,515,571	0.8734	\$229,281,100
3	\$265,571	\$0	\$205,517,000	\$0	\$0	\$0	\$0	\$205,782,571	0.8163	\$167,980,313
4	\$265,571	\$0	\$205,517,000	\$0	\$56,733,000	\$0	\$0	\$262,515,571	0.7629	\$200,273,129
5	\$265,571	\$0	\$205,517,000	\$0	\$0	\$13,776,000	\$308,000	\$219,866,571	0.7130	\$156,764,865
6	\$265,571	\$0	\$205,517,000	\$0	\$56,733,000	\$0	\$0	\$262,515,571	0.6663	\$174,914,125
7	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	0.6227	\$0
8	\$0	\$0	\$0	\$0	\$56,733,000	\$0	\$0	\$56,733,000	0.5820	\$33,018,606
9	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	0.5439	\$0
10	\$0	\$0	\$0	\$0	\$56,733,000	\$13,776,000	\$308,000	\$70,817,000	0.5083	\$35,996,281
11	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	0.4751	\$0
12	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	0.4440	\$0
13	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	0.4150	\$0
14	\$0	\$0	\$0	\$0	\$56,733,000	\$0	\$0	\$56,733,000	0.3878	\$22,001,057
15	\$0	\$0	\$0	\$0	\$0	\$13,776,000	\$308,000	\$14,084,000	0.3624	\$5,104,042
16	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	0.3387	\$0
17	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	0.3166	\$0
18	\$0	\$0	\$0	\$0	\$56,733,000	\$0	\$0	\$56,733,000	0.2959	\$16,787,295
19	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	0.2765	\$0
20	\$0	\$0	\$0	\$0	\$0	\$13,776,000	\$308,000	\$14,084,000	0.2584	\$3,639,306
21	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	0.2415	\$0
22	\$0	\$0	\$0	\$0	\$56,733,000	\$0	\$0	\$56,733,000	0.2257	\$12,804,638
23	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	0.2109	\$0
24	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	0.1971	\$0
25	\$0	\$0	\$0	\$0	\$0	\$13,776,000	\$308,000	\$14,084,000	0.1842	\$2,594,273
26	\$0	\$0	\$0	\$0	\$56,733,000	\$0	\$0	\$56,733,000	0.1722	\$9,769,423
27	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	0.1609	\$0
28	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	0.1504	\$0
29	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	0.1406	\$0
30	\$0	\$0	\$0	\$0	\$56,733,000	\$13,776,000	\$308,000	\$70,817,000	0.1314	\$9,305,354
<b>TOTALS:</b>	<b>\$1,859,000</b>	<b>\$12,270,000</b>	<b>\$1,438,619,000</b>	<b>\$0</b>	<b>\$567,330,000</b>	<b>\$82,656,000</b>	<b>\$1,848,000</b>	<b>\$2,104,582,000</b>		<b>\$1,490,610,769</b>
<b>TOTAL PRESENT VALUE OF ALTERNATIVE E<sup>5</sup></b>										<b>\$1,490,610,000</b>

**Notes:**

<sup>1</sup> The alternative is expected to require cost expenditures for perpetuity since some contamination within the sediment bed and associated riverbank soils would remain in-place that do not allow for unrestricted use or unlimited exposure to human or ecological receptors. However the period of analysis was assumed to be 30 yrs beyond the construction in Year 0.

<sup>2</sup> Capital costs, for purposes of this analysis, are assumed to be distributed as indicated on Table CS-E.

<sup>3</sup> Total annual expenditure is the total cost per year with no discounting.

<sup>4</sup> Present value is the total cost per year including a 7.0% discount factor for that year. See Table PV-ADRFT for details.

<sup>5</sup> Total present value is rounded to the nearest \$10,000. Inflation and depreciation are excluded from the present value cost.

Costs presented for this alternative are expected to have an accuracy between -30% to +50% of actual costs, based on the scope presented.

They are prepared solely to facilitate relative comparisons between alternatives for FS evaluation purposes.

TABLE CS-E

TABLE CS-E						
Alternative	E					
DETAILED COST ESTIMATE SUMMARY						
<b>Site:</b>	Portland Harbor Superfund Site	Description: This alternative evaluates a remedy that would involve dredging of contaminated sediments, disposal of contaminated sediment at offsite facilities (Subtitle D and Subtitle C/TSCA), capping, enhanced monitored natural recovery (EMNR), in-situ treatment, and monitored natural recovery (MNR). Capital costs are based on Disposed Material Management (DMM) Scenario 2.				
<b>Location:</b>	Portland, Oregon					
<b>Phase:</b>	Draft Feasibility Study (-30% to +50%)					
<b>Base Year:</b>	2015					
<b>Date:</b>	8/12/2015					
INSTITUTIONAL CONTROLS CAPITAL COSTS: (Assumed to be Incurred During Years 0 through 6)						
DESCRIPTION	WORKSHEET	QTY	UNIT(S)	UNIT COST	TOTAL	NOTES
Institutional Controls	CW-E2	1	LS	\$1,579,220	\$1,579,220	
SUBTOTAL					\$1,579,220	
Contingency (Scope and Bid)		10%			\$157,922	10% Scope, 0% Bid as documented in Attachment A.
SUBTOTAL					\$1,737,142	
Project Management		2%			\$34,743	Percentage modified as documented in Attachment A.
Remedial Design		2%			\$34,743	Percentage modified as documented in Attachment A.
Construction Management		3%			\$52,114	Percentage modified as documented in Attachment A.
TOTAL					\$1,858,742	
TOTAL CAPITAL COST					\$1,859,000	Total capital cost is rounded to the nearest \$1,000.
MONITORED NATURAL RECOVERY CAPITAL COSTS: (Assumed to be Incurred During Year 0)						
DESCRIPTION	WORKSHEET	QTY	UNIT(S)	UNIT COST	TOTAL	NOTES
Monitored Natural Recovery (MNR) for MNR/Enhanced Monitored Natural Recovery (EMNR) and Broadcast GAC Areas	CW-E22	2,375	AC	\$3,680	\$8,739,489	Quantity represents dredge, MNR/EMNR and in situ treatment areas.
SUBTOTAL					\$8,739,489	
Contingency (Scope and Bid)		20%			\$1,747,898	10% Scope, 10% Bid (Low end of the recommended range in EPA 540-R-00-002).
SUBTOTAL					\$10,487,387	
Project Management		5%			\$524,369	Percentage from Exhibit 5-8 in EPA 540-R-00-002 was used.
Remedial Design		6%			\$629,243	Percentage from Exhibit 5-8 in EPA 540-R-00-002 was used.
Construction Management		6%			\$629,243	Percentage from Exhibit 5-8 in EPA 540-R-00-002 was used.
TOTAL					\$12,270,242	
TOTAL CAPITAL COST					\$12,270,000	Total capital cost is rounded to the nearest \$1,000.



TABLE CS-E

TABLE CS-E						
Alternative E		DETAILED COST ESTIMATE SUMMARY				
Site:	Portland Harbor Superfund Site	Description:	This alternative evaluates a remedy that would involve dredging of contaminated sediments, disposal of contaminated sediment at offsite facilities (Subtitle D and Subtitle C/TSCA), capping, enhanced monitored natural recovery (EMNR), in-situ treatment, and monitored natural recovery (MNR). Capital costs are based on Disposed Material Management (DMM) Scenario 2.			
Location:	Portland, Oregon					
Phase:	Draft Feasibility Study (-30% to +50%)					
Base Year:	2015					
Date:	8/12/2015					
TECHNOLOGY ASSIGNMENTS MEASURES CAPITAL CONSTRUCTION COSTS: (Assumed to be Incurred During Years 0 through 6)						
DESCRIPTION	WORKSHEET	QTY	UNIT(S)	UNIT COST	TOTAL	NOTES
Mobilization / Demobilization	CW-E1	1	LS	\$17,645,000	\$17,645,000	
Transload Facility Development	CW-E21	1	LS	\$14,447,813	\$14,447,813	
Debris Removal and Disposal	CW-E5	329	AC	\$13,084	\$4,305,653	
Obstruction Removal and Relocation	CW-E6	1	LS	\$15,790,250	\$15,790,250	
Erosion/Residual Control Measures	CW-E7	1	LS	\$24,941,250	\$24,941,250	
Dredging of Contaminated Sediments (Open Water)	CW-E8	2,050,277	CY	\$38	\$77,961,783	
Dredging of Contaminated Sediments (Confined)	CW-E9	354,680	CY	\$54	\$19,033,016	
Excavation of Contaminated Sediments (From Shore for Riverbanks)	CW-E10	89,212	CY	\$47	\$4,175,122	
Hydraulic Offloading of the Contaminated Sediments	CW-E11	2,494,169	CY	\$6	\$15,713,265	Includes offloading contaminated sediments the transload facility (for Subtitle C/TSCA or Subtitle D disposal).
Subtitle C/TSCA Disposal (Handling, Transportation, Treatment of Select PTW Materials, and Disposal)	CW-E12	387,584	CY	\$949	\$367,688,307	Includes waste going to offsite Subtitle C/TSCA facility for disposal, including the volume of NRC/NAPL PTW that would require treatment.
Subtitle D Disposal (Handling, Transportation, and Disposal)	CW-E13	2,106,585	CY	\$127	\$266,724,501	Includes waste going to offsite Subtitle D facility for disposal without treatment, including the volume of "concentration"-based PTW (such as DDx and non-TSCA PCBs).
Mitigation	CW-E14	42	AC	\$2,369,484	\$99,518,323	
Sand Placement for Technology Assignments	CW-E15	762,409	CY	\$48	\$36,697,298	
Beach Mix Placement for Technology Assignments	CW-E16	35,348	CY	\$96	\$3,400,581	
Armor Placement for Technology Assignments	CW-E17	68,386	CY	\$98	\$6,730,702	
Reactive/GAC Placement for Technology Assignments	CW-E18	15,410	TON	\$8,861	\$136,542,696	
Geofabric for Riverbanks	CW-E19	18	AC	\$14,124	\$254,238	
Organoclay Mat Placement for Technology Assignments	CW-E20	19	AC	\$465,805	\$8,850,304	
SUBTOTAL					\$1,120,420,102	
Contingency (Scope and Bid)		20%			\$224,084,020	10% Scope, 10% Bid (Low end of the recommended range in EPA 540-R-00-002).
SUBTOTAL					\$1,344,504,122	
Project Management		2%			\$26,890,082	Percentage modified as documented in Attachment A.
Remedial Design		2%			\$26,890,082	Percentage modified as documented in Attachment A.
Construction Management		3%			\$40,335,124	Percentage modified as documented in Attachment A.
TOTAL					\$1,438,619,410	
TOTAL CAPITAL COST					\$1,438,619,000	Total capital cost is rounded to the nearest \$1,000.

TABLE CS-E

Alternative		E		DETAILED COST ESTIMATE SUMMARY			
<b>Site:</b>	Portland Harbor Superfund Site	<b>Description:</b>	This alternative evaluates a remedy that would involve dredging of contaminated sediments, disposal of contaminated sediment at offsite facilities (Subtitle D and Subtitle C/TSCA), capping, enhanced monitored natural recovery (EMNR), in-situ treatment, and monitored natural recovery (MNR). Capital costs are based on Disposed Material Management (DMM) Scenario 2.				
<b>Location:</b>	Portland, Oregon						
<b>Phase:</b>	Draft Feasibility Study (-30% to +50%)						
<b>Base Year:</b>	2015						
<b>Date:</b>	8/12/2015						
SITE-WIDE MONITORING AND MONITORED NATURAL RECOVERY PERIODIC COSTS: (Assumed to be Incurred at Years 2, 4, 6, 8, 10 and Every 4 Years through Period of Analysis)							
DESCRIPTION	WORKSHEET	QTY	UNIT(S)	UNIT COST	TOTAL	NOTES	
Monitored Natural Recovery (MNR) for MNR/Enhanced Monitored Natural Recovery (EMNR) and Broadcast GAC Areas	CW-E22	1	LS	\$8,739,489	\$8,739,489		
Site-Wide Monitoring	CW-E23	1	LS	\$955,960	\$955,960		
Cap Area Monitoring and Reactive Layer Monitoring	CW-E24	1	LS	\$34,489,035	\$34,489,035		
SUBTOTAL					\$44,184,484		
Contingency (Scope and Bid)		20%			\$8,836,897	10% Scope, 10% Bid (Low end of the recommended range in EPA 540-R-00-002).	
SUBTOTAL					\$53,021,381		
Project Management		2%			\$1,060,428	Percentage modified as documented in Attachment A.	
Technical Support		5%			\$2,651,069	Percentage modified as documented in Attachment A.	
TOTAL					\$56,732,878		
TOTAL PERIODIC COST					\$56,733,000	Total periodic cost is rounded to the nearest \$1,000.	
LONG TERM OPERATIONS AND MAINTENANCE PERIODIC COSTS: (Assumed to be Incurred at Year 5 and Every 5 Years through Period of Analysis)							
DESCRIPTION	WORKSHEET	QTY	UNIT(S)	UNIT COST	TOTAL	NOTES	
Long-Term Maintenance for Capping, EMNR, and In Situ Treatment	CW-E25	1	LS	\$9,782,543	\$9,782,543	Assume 5% of placement of additional material for capping, EMNR and In Situ Treatment. Includes mobilization and demobilization costs.	
SUBTOTAL					\$9,782,543		
Contingency (Scope and Bid)		20%			\$1,956,509	10% Scope, 10% Bid (Low end of the recommended range in EPA 540-R-00-002).	
SUBTOTAL					\$11,739,052		
Project Management		5%			\$586,953	Low end of the recommended range in EPA 540-R-00-002 was used.	
Technical Support		10%			\$1,173,905	Low end of the recommended range in EPA 540-R-00-002 was used.	
TOTAL					\$13,499,910		
TOTAL PERIODIC COST					\$13,500,000	Total periodic cost is rounded to the nearest \$1,000.	

TABLE CS-E

TABLE CS-E						
Alternative	E					
DETAILED COST ESTIMATE SUMMARY						
<b>Site:</b>	Portland Harbor Superfund Site	Description:	This alternative evaluates a remedy that would involve dredging of contaminated sediments, disposal of contaminated sediment at offsite facilities (Subtitle D and Subtitle C/TSCA), capping, enhanced monitored natural recovery (EMNR), in-situ treatment, and monitored natural recovery (MNR). Capital costs are based on Disposed Material Management (DMM) Scenario 2.			
<b>Location:</b>	Portland, Oregon					
<b>Phase:</b>	Draft Feasibility Study (-30% to +50%)					
<b>Base Year:</b>	2015					
<b>Date:</b>	8/12/2015					
INSTITUTIONAL CONTROLS PERIODIC COSTS: (Assumed to be Incurred at Year 5 and Every 5 Years through Period of Analysis)						
DESCRIPTION	WORKSHEET	QTY	UNIT(S)	UNIT COST	TOTAL	NOTES
Evaluating and Updating Institutional Controls	CW-E3	1	LS	\$218,260	\$218,260	
SUBTOTAL					\$218,260	
Contingency (Scope and Bid)		10%			\$21,826	10% Scope, 0% Bid as documented in Attachment A.
SUBTOTAL					\$240,086	
Project Management		5%			\$12,004	Low end of the recommended range in EPA 540-R-00-002 was used.
Technical Support		10%			\$24,009	Low end of the recommended range in EPA 540-R-00-002 was used.
TOTAL					\$276,099	
TOTAL PERIODIC COST					\$276,000	Total periodic cost is rounded to the nearest \$1,000.
5-YEAR SITE REVIEW PERIODIC COSTS: (Assumed to be Incurred at Year 5 and Every 5 Years through Period of Analysis)						
DESCRIPTION	WORKSHEET	QTY	UNIT(S)	UNIT COST	TOTAL	NOTES
5-Year Site Review	CW-E26	1	LS	\$243,666	\$243,666	
SUBTOTAL					\$243,666	
Contingency (Scope and Bid)		10%			\$24,367	10% Scope, 0% Bid as documented in Attachment A.
SUBTOTAL					\$268,033	
Project Management		5%			\$13,402	Low end of the recommended range in EPA 540-R-00-002 was used.
Technical Support		10%			\$26,803	Low end of the recommended range in EPA 540-R-00-002 was used.
TOTAL					\$308,238	
TOTAL PERIODIC COST					\$308,000	Total periodic cost is rounded to the nearest \$1,000.

**Notes:**

Percentages used for contingency and professional/technical services costs are based on guidance from Section 5.0 of "A Guide to Developing and Documenting Cost Estimates During the Feasibility Study", EPA 2000. Modifications to the percentages applied for contingency and professional/technical services are documented in Attachment A.

Costs presented for this alternative are expected to have an accuracy between -30% to +50% of actual costs, based on the scope presented. They are prepared solely to facilitate relative comparisons between alternatives for FS evaluation purposes.

**Abbreviations:**

AC	Acre
CY	Cubic Yard
LS	Lump Sum
QTY	Quantity
TON	Ton

**Present Value Analysis and Detailed Cost Estimate Summary  
Alternative F**

TABLE PV-F

## PRESENT VALUE ANALYSIS

Alternative F

Site: Portland Harbor Superfund Site  
 Location: Portland, Oregon  
 Phase: Draft Feasibility Study (-30% to +50%)  
 Base Year: 2015

Year <sup>1</sup>	Capital Costs (Institutional Controls) <sup>2</sup>	Capital Costs (Monitored Natural Recovery) <sup>2</sup>	Capital Costs (Technology Assignments) <sup>2</sup>	Annual O&M Costs	Periodic Costs (Long Term Monitoring and Monitored Natural Recovery)	Periodic Costs (Long Term Operations and Maintenance and Institutional Controls)	Periodic Costs (Five-Year Site Reviews)	Total Annual Expenditure <sup>3</sup>	Discount Factor (7.0%)	Present Value <sup>4</sup>
0	\$154,917	\$11,198,000	\$197,978,417	\$0	\$0	\$0	\$0	\$209,331,334	1.0000	\$209,331,334
1	\$154,917	\$0	\$197,978,417	\$0	\$0	\$0	\$0	\$198,133,334	0.9346	\$185,175,414
2	\$154,917	\$0	\$197,978,417	\$0	\$69,065,000	\$0	\$0	\$267,198,334	0.8734	\$233,371,025
3	\$154,917	\$0	\$197,978,417	\$0	\$0	\$0	\$0	\$198,133,334	0.8163	\$161,736,241
4	\$154,917	\$0	\$197,978,417	\$0	\$69,065,000	\$0	\$0	\$267,198,334	0.7629	\$203,845,609
5	\$154,917	\$0	\$197,978,417	\$0	\$0	\$18,442,000	\$308,000	\$216,883,334	0.7130	\$154,637,817
6	\$154,917	\$0	\$197,978,417	\$0	\$69,065,000	\$0	\$0	\$267,198,334	0.6663	\$178,034,260
7	\$154,917	\$0	\$197,978,417	\$0	\$0	\$0	\$0	\$198,133,334	0.6227	\$123,377,627
8	\$154,917	\$0	\$197,978,417	\$0	\$69,065,000	\$0	\$0	\$267,198,334	0.5820	\$155,509,430
9	\$154,917	\$0	\$197,978,417	\$0	\$0	\$0	\$0	\$198,133,334	0.5439	\$107,764,720
10	\$154,917	\$0	\$197,978,417	\$0	\$69,065,000	\$18,442,000	\$308,000	\$285,948,334	0.5083	\$145,347,538
11	\$154,917	\$0	\$197,978,417	\$0	\$0	\$0	\$0	\$198,133,334	0.4751	\$94,133,147
12	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	0.4440	\$0
13	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	0.4150	\$0
14	\$0	\$0	\$0	\$0	\$69,065,000	\$0	\$0	\$69,065,000	0.3878	\$26,783,407
15	\$0	\$0	\$0	\$0	\$0	\$18,442,000	\$308,000	\$18,750,000	0.3624	\$6,795,000
16	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	0.3387	\$0
17	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	0.3166	\$0
18	\$0	\$0	\$0	\$0	\$69,065,000	\$0	\$0	\$69,065,000	0.2959	\$20,436,334
19	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	0.2765	\$0
20	\$0	\$0	\$0	\$0	\$0	\$18,442,000	\$308,000	\$18,750,000	0.2584	\$4,845,000
21	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	0.2415	\$0
22	\$0	\$0	\$0	\$0	\$69,065,000	\$0	\$0	\$69,065,000	0.2257	\$15,587,971
23	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	0.2109	\$0
24	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	0.1971	\$0
25	\$0	\$0	\$0	\$0	\$0	\$18,442,000	\$308,000	\$18,750,000	0.1842	\$3,453,750
26	\$0	\$0	\$0	\$0	\$69,065,000	\$0	\$0	\$69,065,000	0.1722	\$11,892,993
27	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	0.1609	\$0
28	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	0.1504	\$0
29	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	0.1406	\$0
30	\$0	\$0	\$0	\$0	\$69,065,000	\$18,442,000	\$308,000	\$87,815,000	0.1314	\$11,538,891
<b>TOTALS:</b>	<b>\$1,859,000</b>	<b>\$11,198,000</b>	<b>\$2,375,741,000</b>	<b>\$0</b>	<b>\$690,650,000</b>	<b>\$110,652,000</b>	<b>\$1,848,000</b>	<b>\$3,191,948,000</b>		<b>\$2,053,600,000</b>
<b>TOTAL PRESENT VALUE OF ALTERNATIVE F<sup>5</sup></b>										<b>\$2,053,600,000</b>

**Notes:**

<sup>1</sup> The alternative is expected to require cost expenditures for perpetuity since some contamination within the sediment bed and associated riverbank soils would remain in-place that do not allow for unrestricted use or unlimited exposure to human or ecological receptors. However the period of analysis was assumed to be 30 yrs beyond the construction in Year 0.

<sup>2</sup> Capital costs, for purposes of this analysis, are assumed to be distributed as indicated on Table CS-F.

<sup>3</sup> Total annual expenditure is the total cost per year with no discounting.

<sup>4</sup> Present value is the total cost per year including a 7.0% discount factor for that year. See Table PV-ADRFT for details.

<sup>5</sup> Total present value is rounded to the nearest \$10,000. Inflation and depreciation are excluded from the present value cost.

Costs presented for this alternative are expected to have an accuracy between -30% to +50% of actual costs, based on the scope presented.

They are prepared solely to facilitate relative comparisons between alternatives for FS evaluation purposes.

TABLE CS-F

Alternative	F	DETAILED COST ESTIMATE SUMMARY				
<b>Site:</b>	Portland Harbor Superfund Site	<b>Description:</b> This alternative evaluates a remedy that would involve dredging of contaminated sediments, disposal of the remaining contaminated sediment at offsite facilities (Subtitle D and Subtitle C/TSCA), capping, enhanced monitored natural recovery (EMNR), in-situ treatment, and monitored natural recovery (MNR). Capital costs are based on Disposed Material Management (DMM) Scenario 2.				
<b>Location:</b>	Portland, Oregon					
<b>Phase:</b>	Draft Feasibility Study (-30% to +50%)					
<b>Base Year:</b>	2015					
<b>Date:</b>	8/12/2015					
<b>INSTITUTIONAL CONTROLS CAPITAL COSTS: (Assumed to be Incurred During Years 0 through 11)</b>						
<b>DESCRIPTION</b>	<b>WORKSHEET</b>	<b>QTY</b>	<b>UNIT(S)</b>	<b>UNIT COST</b>	<b>TOTAL</b>	<b>NOTES</b>
Institutional Controls	CW-F2	1	LS	\$1,579,220	\$1,579,220	
<b>SUBTOTAL</b>					\$1,579,220	
Contingency (Scope and Bid)		10%			\$157,922	10% Scope, 0% Bid as documented in Attachment A.
<b>SUBTOTAL</b>					\$1,737,142	
Project Management		2%			\$34,743	Percentage modified as documented in Attachment A.
Remedial Design		2%			\$34,743	Percentage modified as documented in Attachment A.
Construction Management		3%			\$52,114	Percentage modified as documented in Attachment A.
<b>TOTAL</b>					\$1,858,742	
<b>TOTAL CAPITAL COST</b>					<b>\$1,859,000</b>	Total capital cost is rounded to the nearest \$1,000.
<b>MONITORED NATURAL RECOVERY CAPITAL COSTS: (Assumed to be Incurred During Year 0)</b>						
<b>DESCRIPTION</b>	<b>WORKSHEET</b>	<b>QTY</b>	<b>UNIT(S)</b>	<b>UNIT COST</b>	<b>TOTAL</b>	<b>NOTES</b>
Monitored Natural Recovery (MNR) for MNR/Enhanced Monitored Natural Recovery (EMNR) and Broadcast GAC Areas	CW-F22	2,131	AC	\$3,680	\$7,841,622	Quantity represents dredge, MNR/EMNR and in situ treatment areas.
<b>SUBTOTAL</b>					\$7,841,622	
Contingency (Scope and Bid)		20%			\$1,568,324	10% Scope, 10% Bid (Low end of the recommended range in EPA 540-R-00-002).
<b>SUBTOTAL</b>					\$9,409,946	
Project Management		5%			\$470,497	Percentage from Exhibit 5-8 in EPA 540-R-00-002 was used.
Remedial Design		8%			\$752,796	Percentage from Exhibit 5-8 in EPA 540-R-00-002 was used.
Construction Management		6%			\$564,597	Percentage from Exhibit 5-8 in EPA 540-R-00-002 was used.
<b>TOTAL</b>					\$11,197,836	
<b>TOTAL CAPITAL COST</b>					<b>\$11,198,000</b>	Total capital cost is rounded to the nearest \$1,000.

TABLE CS-F

TABLE CS-F						
Alternative F		DETAILED COST ESTIMATE SUMMARY				
<b>Site:</b>	Portland Harbor Superfund Site	<b>Description:</b>	This alternative evaluates a remedy that would involve dredging of contaminated sediments, disposal of the remaining contaminated sediment at offsite facilities (Subtitle D and Subtitle C/TSCA), capping, enhanced monitored natural recovery (EMNR), in-situ treatment, and monitored natural recovery (MNR). Capital costs are based on Disposed Material Management (DMM) Scenario 2.			
<b>Location:</b>	Portland, Oregon					
<b>Phase:</b>	Draft Feasibility Study (-30% to +50%)					
<b>Base Year:</b>	2015					
<b>Date:</b>	8/12/2015					
TECHNOLOGY ASSIGNMENTS MEASURES CAPITAL CONSTRUCTION COSTS: (Assumed to be Incurred During Years 0 through 11)						
DESCRIPTION	WORKSHEET	QTY	UNIT(S)	UNIT COST	TOTAL	NOTES
Mobilization / Demobilization	CW-F1	1	LS	\$29,139,000	\$29,139,000	
Transload Facility Development	CW-F21	1	LS	\$18,708,750	\$18,708,750	
Debris Removal and Disposal	CW-F5	537	AC	\$13,084	\$7,032,365	
Obstruction Removal and Relocation	CW-F6	1	LS	\$21,452,884	\$21,452,884	
Erosion/Residual Control Measures	CW-F7	1	LS	\$26,924,625	\$26,924,625	
Dredging of Contaminated Sediments (Open Water)	CW-F8	4,585,640	CY	\$38	\$174,368,961	
Dredging of Contaminated Sediments (Confined)	CW-F9	527,320	CY	\$54	\$28,297,310	
Excavation of Contaminated Sediments (From Shore for Riverbanks)	CW-F10	108,059	CY	\$47	\$5,057,161	
Hydraulic Offloading of the Contaminated Sediments	CW-F11	5,221,019	CY	\$6	\$32,892,420	Includes offloading contaminated sediments at the transload facility (for Subtitle C/TSCA or Subtitle D disposal).
Subtitle C/TSCA Disposal (Handling, Transportation, Treatment of Select PTW Materials, and Disposal)	CW-F12	443,819	CY	\$949	\$421,036,342	Includes waste going to offsite Subtitle C/TSCA facility for disposal, including the volume of NRC/NAPL PTW that would require treatment.
Subtitle D Disposal (Handling, Transportation, and Disposal)	CW-F13	4,777,200	CY	\$125	\$596,146,293	Includes waste going to offsite Subtitle D facility for disposal without treatment, including the volume of "concentration"-based PTW (such as DDx and non-TSCA PCBs).
Mitigation	CW-F14	98	AC	\$2,347,130	\$230,018,765	
Sand Placement for Technology Assignments	CW-F15	1,399,799	CY	\$47	\$65,640,258	
Beach Mix Placement for Technology Assignments	CW-F16	50,113	CY	\$94	\$4,704,669	
Armor Placement for Technology Assignments	CW-F17	158,067	CY	\$95	\$15,000,200	
Reactive/GAC Placement for Technology Assignments	CW-F18	18,527	TON	\$8,861	\$164,158,843	
Geofabric for Riverbanks	CW-F19	22	AC	\$14,153	\$311,370	
Organoclay Mat Placement for Technology Assignments	CW-F20	21	AC	\$446,436	\$9,375,147	
SUBTOTAL					\$1,850,265,363	
Contingency (Scope and Bid)		20%			\$370,053,073	10% Scope, 10% Bid (Low end of the recommended range in EPA 540-R-00-002).
SUBTOTAL					\$2,220,318,436	
Project Management		2%			\$44,406,369	Percentage modified as documented in Attachment A.
Remedial Design		2%			\$44,406,369	Percentage modified as documented in Attachment A.
Construction Management		3%			\$66,609,553	Percentage modified as documented in Attachment A.
TOTAL					\$2,375,740,727	
TOTAL CAPITAL COST					\$2,375,741,000	Total capital cost is rounded to the nearest \$1,000.

TABLE CS-F

Alternative	F	DETAILED COST ESTIMATE SUMMARY				
<b>Site:</b>	Portland Harbor Superfund Site	<b>Description:</b> This alternative evaluates a remedy that would involve dredging of contaminated sediments, disposal of the remaining contaminated sediment at offsite facilities (Subtitle D and Subtitle C/TSCA), capping, enhanced monitored natural recovery (EMNR), in-situ treatment, and monitored natural recovery (MNR). Capital costs are based on Disposed Material Management (DMM) Scenario 2.				
<b>Location:</b>	Portland, Oregon					
<b>Phase:</b>	Draft Feasibility Study (-30% to +50%)					
<b>Base Year:</b>	2015					
<b>Date:</b>	8/12/2015					
<b>SITE-WIDE MONITORING AND MONITORED NATURAL RECOVERY PERIODIC COSTS: (Assumed to be Incurred at Years 2, 4, 6, 8, 10 and Every 4 Years through Period of Analysis)</b>						
<b>DESCRIPTION</b>	<b>WORKSHEET</b>	<b>QTY</b>	<b>UNIT(S)</b>	<b>UNIT COST</b>	<b>TOTAL</b>	<b>NOTES</b>
Monitored Natural Recovery (MNR) for MNR/Enhanced Monitored Natural Recovery (EMNR) and Broadcast GAC Areas	CW-F22	1	LS	\$7,841,622	\$7,841,622	
Site-Wide Monitoring	CW-F23	1	LS	\$955,960	\$955,960	
Cap Area Monitoring and Reactive Layer Monitoring	CW-F24	1	LS	\$44,991,175	\$44,991,175	
<b>SUBTOTAL</b>					\$53,788,757	
Contingency (Scope and Bid)		20%			\$10,757,751	10% Scope, 10% Bid (Low end of the recommended range in EPA 540-R-00-002).
<b>SUBTOTAL</b>					\$64,546,508	
Project Management		2%			\$1,290,930	Percentage modified as documented in Attachment A.
Technical Support		5%			\$3,227,325	Percentage modified as documented in Attachment A.
<b>TOTAL</b>					\$69,064,763	
<b>TOTAL PERIODIC COST</b>					\$69,065,000	Total periodic cost is rounded to the nearest \$1,000.
<b>LONG TERM OPERATIONS AND MAINTENANCE PERIODIC COSTS: (Assumed to be Incurred at Year 5 and Every 5 Years through Period of Analysis)</b>						
<b>DESCRIPTION</b>	<b>WORKSHEET</b>	<b>QTY</b>	<b>UNIT(S)</b>	<b>UNIT COST</b>	<b>TOTAL</b>	<b>NOTES</b>
Long-Term Maintenance for Capping, EMNR, and In Situ Treatment	CW-F25	1	LS	\$13,164,005	\$13,164,005	Assume 5% of placement of additional material for capping, EMNR and In Situ Treatment. Includes mobilization and demobilization costs
<b>SUBTOTAL</b>					\$13,164,005	
Contingency (Scope and Bid)		20%			\$2,632,801	10% Scope, 10% Bid (Low end of the recommended range in EPA 540-R-00-002).
<b>SUBTOTAL</b>					\$15,796,806	
Project Management		5%			\$789,840	Low end of the recommended range in EPA 540-R-00-002 was used.
Technical Support		10%			\$1,579,681	Low end of the recommended range in EPA 540-R-00-002 was used.
<b>TOTAL</b>					\$18,166,327	
<b>TOTAL PERIODIC COST</b>					\$18,166,000	Total periodic cost is rounded to the nearest \$1,000.



TABLE CS-F

TABLE CS-F						
Alternative F		DETAILED COST ESTIMATE SUMMARY				
<b>Site:</b>	Portland Harbor Superfund Site	<b>Description:</b>	This alternative evaluates a remedy that would involve dredging of contaminated sediments, disposal of the remaining contaminated sediment at offsite facilities (Subtitle D and Subtitle C/TSCA), capping, enhanced monitored natural recovery (EMNR), in-situ treatment, and monitored natural recovery (MNR). Capital costs are based on Disposed Material Management (DMM) Scenario 2.			
<b>Location:</b>	Portland, Oregon					
<b>Phase:</b>	Draft Feasibility Study (-30% to +50%)					
<b>Base Year:</b>	2015					
<b>Date:</b>	8/12/2015					
INSTITUTIONAL CONTROLS PERIODIC COSTS: (Assumed to be Incurred at Year 5 and Every 5 Years through Period of Analysis)						
<b>DESCRIPTION</b>	<b>WORKSHEET</b>	<b>QTY</b>	<b>UNIT(S)</b>	<b>UNIT COST</b>	<b>TOTAL</b>	<b>NOTES</b>
Evaluating and Updating Institutional Controls	CW-F3	1	LS	\$218,260	\$218,260	
<b>SUBTOTAL</b>					\$218,260	
Contingency (Scope and Bid)		10%			\$21,826	10% Scope, 0% Bid as documented in Attachment A.
<b>SUBTOTAL</b>					\$240,086	
Project Management		5%			\$12,004	Low end of the recommended range in EPA 540-R-00-002 was used.
Technical Support		10%			\$24,009	Low end of the recommended range in EPA 540-R-00-002 was used.
<b>TOTAL</b>					\$276,099	
<b>TOTAL PERIODIC COST</b>					<b>\$276,000</b>	Total periodic cost is rounded to the nearest \$1,000.
5-YEAR SITE REVIEW PERIODIC COSTS: (Assumed to be Incurred at Year 5 and Every 5 Years through Period of Analysis)						
<b>DESCRIPTION</b>	<b>WORKSHEET</b>	<b>QTY</b>	<b>UNIT(S)</b>	<b>UNIT COST</b>	<b>TOTAL</b>	<b>NOTES</b>
5-Year Site Review	CW-F26	1	LS	\$243,666	\$243,666	
<b>SUBTOTAL</b>					\$243,666	
Contingency (Scope and Bid)		10%			\$24,367	10% Scope, 0% Bid as documented in Attachment A.
<b>SUBTOTAL</b>					\$268,033	
Project Management		5%			\$13,402	Low end of the recommended range in EPA 540-R-00-002 was used.
Technical Support		10%			\$26,803	Low end of the recommended range in EPA 540-R-00-002 was used.
<b>TOTAL</b>					\$308,238	
<b>TOTAL PERIODIC COST</b>					<b>\$308,000</b>	Total periodic cost is rounded to the nearest \$1,000.

**Notes:**

Percentages used for contingency and professional/technical services costs are based on guidance from Section 5.0 of "A Guide to Developing and Documenting Cost Estimates During the Feasibility Study", EPA 2000. Modifications to the percentages applied for contingency and professional/technical services are documented in Attachment A.

Costs presented for this alternative are expected to have an accuracy between -30% to +50% of actual costs, based on the scope presented. They are prepared solely to facilitate relative comparisons between alternatives for FS evaluation purposes.

**Abbreviations:**

AC Acre  
 CY Cubic Yard  
 LS Lump Sum  
 QTY Quantity  
 TON Ton

**Present Value Analysis and Detailed Cost Estimate Summary  
Alternative G**

TABLE PV-G

## PRESENT VALUE ANALYSIS

Alternative G

Site: Portland Harbor Superfund Site  
 Location: Portland, Oregon  
 Phase: Draft Feasibility Study (-30% to +50%)  
 Base Year: 2015

Year <sup>1</sup>	Capital Costs (Institutional Controls) <sup>2</sup>	Capital Costs (Monitored Natural Recovery) <sup>2</sup>	Capital Costs (Technology Assignments) <sup>2</sup>	Annual O&M Costs	Periodic Costs (Long Term Monitoring and Monitored Natural Recovery)	Periodic Costs (Long Term Operations and Maintenance and Institutional Controls)	Periodic Costs (Five-Year Site Reviews)	Total Annual Expenditure <sup>3</sup>	Discount Factor (7.0%)	Present Value <sup>4</sup>
0	\$103,278	\$9,795,000	\$185,778,500	\$0	\$0	\$0	\$0	\$195,676,778	1.0000	\$195,676,778
1	\$103,278	\$0	\$185,778,500	\$0	\$0	\$0	\$0	\$185,881,778	0.9346	\$173,725,110
2	\$103,278	\$0	\$185,778,500	\$0	\$83,592,000	\$0	\$0	\$269,473,778	0.8734	\$235,358,398
3	\$103,278	\$0	\$185,778,500	\$0	\$0	\$0	\$0	\$185,881,778	0.8163	\$151,735,295
4	\$103,278	\$0	\$185,778,500	\$0	\$83,592,000	\$0	\$0	\$269,473,778	0.7629	\$205,581,545
5	\$103,278	\$0	\$185,778,500	\$0	\$0	\$23,326,000	\$308,000	\$209,515,778	0.7130	\$149,384,750
6	\$103,278	\$0	\$185,778,500	\$0	\$83,592,000	\$0	\$0	\$269,473,778	0.6663	\$179,550,378
7	\$103,278	\$0	\$185,778,500	\$0	\$0	\$0	\$0	\$185,881,778	0.6227	\$115,748,583
8	\$103,278	\$0	\$185,778,500	\$0	\$83,592,000	\$0	\$0	\$269,473,778	0.5820	\$156,833,739
9	\$103,278	\$0	\$185,778,500	\$0	\$0	\$0	\$0	\$185,881,778	0.5439	\$101,101,099
10	\$103,278	\$0	\$185,778,500	\$0	\$83,592,000	\$23,326,000	\$308,000	\$293,107,778	0.5083	\$148,986,684
11	\$103,278	\$0	\$185,778,500	\$0	\$0	\$0	\$0	\$185,881,778	0.4751	\$88,312,433
12	\$103,278	\$0	\$185,778,500	\$0	\$0	\$0	\$0	\$185,881,778	0.4440	\$82,531,509
13	\$103,278	\$0	\$185,778,500	\$0	\$0	\$0	\$0	\$185,881,778	0.4150	\$77,140,938
14	\$103,278	\$0	\$185,778,500	\$0	\$83,592,000	\$0	\$0	\$269,473,778	0.3878	\$104,501,931
15	\$103,278	\$0	\$185,778,500	\$0	\$0	\$23,326,000	\$308,000	\$209,515,778	0.3624	\$75,928,518
16	\$103,278	\$0	\$185,778,500	\$0	\$0	\$0	\$0	\$185,881,778	0.3387	\$62,958,158
17	\$103,278	\$0	\$185,778,500	\$0	\$0	\$0	\$0	\$185,881,778	0.3166	\$58,850,171
18	\$0	\$0	\$0	\$0	\$83,592,000	\$0	\$0	\$83,592,000	0.2959	\$24,734,873
19	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	0.2765	\$0
20	\$0	\$0	\$0	\$0	\$0	\$23,326,000	\$308,000	\$23,634,000	0.2584	\$6,107,026
21	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	0.2415	\$0
22	\$0	\$0	\$0	\$0	\$83,592,000	\$0	\$0	\$83,592,000	0.2257	\$18,866,714
23	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	0.2109	\$0
24	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	0.1971	\$0
25	\$0	\$0	\$0	\$0	\$0	\$23,326,000	\$308,000	\$23,634,000	0.1842	\$4,353,383
26	\$0	\$0	\$0	\$0	\$83,592,000	\$0	\$0	\$83,592,000	0.1722	\$14,394,542
27	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	0.1609	\$0
28	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	0.1504	\$0
29	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	0.1406	\$0
30	\$0	\$0	\$0	\$0	\$83,592,000	\$23,326,000	\$308,000	\$107,226,000	0.1314	\$14,089,496
<b>TOTALS:</b>	<b>\$1,859,000</b>	<b>\$9,795,000</b>	<b>\$3,344,013,000</b>	<b>\$0</b>	<b>\$835,920,000</b>	<b>\$139,956,000</b>	<b>\$1,848,000</b>	<b>\$4,333,391,000</b>		<b>\$2,446,452,051</b>
<b>TOTAL PRESENT VALUE OF ALTERNATIVE G<sup>5</sup></b>										<b>\$2,446,450,000</b>

**Notes:**

<sup>1</sup> The alternative is expected to require cost expenditures for perpetuity since some contamination within the sediment bed and associated riverbank soils would remain in-place that do not allow for unrestricted use or unlimited exposure to human or ecological receptors. However the period of analysis was assumed to be 30 yrs beyond the construction in Year 0.

<sup>2</sup> Capital costs, for purposes of this analysis, are assumed to be distributed as indicated on Table CS-G.

<sup>3</sup> Total annual expenditure is the total cost per year with no discounting.

<sup>4</sup> Present value is the total cost per year including a 7.0% discount factor for that year. See Table PV-ADRFT for details.

<sup>5</sup> Total present value is rounded to the nearest \$10,000. Inflation and depreciation are excluded from the present value cost.

Costs presented for this alternative are expected to have an accuracy between -30% to +50% of actual costs, based on the scope presented.

They are prepared solely to facilitate relative comparisons between alternatives for FS evaluation purposes.

TABLE CS-G

TABLE CS-G						
Alternative G		DETAILED COST ESTIMATE SUMMARY				
<b>Site:</b>	Portland Harbor Superfund Site	<b>Description:</b> This alternative evaluates a remedy that would involve dredging of contaminated sediments, disposal of the remaining contaminated sediment at offsite facilities (Subtitle D and Subtitle C/TSCA), capping, enhanced monitored natural recovery (EMNR), in-situ treatment, and monitored natural recovery (MNR). Capital costs are based on Disposed Material Management (DMM) Scenario 2.				
<b>Location:</b>	Portland, Oregon					
<b>Phase:</b>	Draft Feasibility Study (-30% to +50%)					
<b>Base Year:</b>	2015					
<b>Date:</b>	8/12/2015					
INSTITUTIONAL CONTROLS CAPITAL COSTS: (Assumed to be Incurred During Years 0 through 17)						
<b>DESCRIPTION</b>	<b>WORKSHEET</b>	<b>QTY</b>	<b>UNIT(S)</b>	<b>UNIT COST</b>	<b>TOTAL</b>	<b>NOTES</b>
Institutional Controls	CW-G2	1	LS	\$1,579,220	\$1,579,220	
<b>SUBTOTAL</b>					\$1,579,220	
Contingency (Scope and Bid)		10%			\$157,922	10% Scope, 0% Bid as documented in Attachment A.
<b>SUBTOTAL</b>					\$1,737,142	
Project Management		2%			\$34,743	Percentage modified as documented in Attachment A.
Remedial Design		2%			\$34,743	Percentage modified as documented in Attachment A.
Construction Management		3%			\$52,114	Percentage modified as documented in Attachment A.
<b>TOTAL</b>					\$1,858,742	
<b>TOTAL CAPITAL COST</b>					<b>\$1,859,000</b>	Total capital cost is rounded to the nearest \$1,000.
MONITORED NATURAL RECOVERY CAPITAL COSTS: (Assumed to be Incurred During Year 0)						
<b>DESCRIPTION</b>	<b>WORKSHEET</b>	<b>QTY</b>	<b>UNIT(S)</b>	<b>UNIT COST</b>	<b>TOTAL</b>	<b>NOTES</b>
Monitored Natural Recovery (MNR) for MNR/Enhanced Monitored Natural Recovery (EMNR) and Broadcast GAC Areas	CW-G22	1,864	AC	\$3,680	\$6,859,119	Quantity represents dredge, MNR/EMNR and in situ treatment areas.
<b>SUBTOTAL</b>					\$6,859,119	
Contingency (Scope and Bid)		20%			\$1,371,824	10% Scope, 10% Bid (Low end of the recommended range in EPA 540-R-00-002).
<b>SUBTOTAL</b>					\$8,230,943	
Project Management		5%			\$411,547	Percentage from Exhibit 5-8 in EPA 540-R-00-002 was used.
Remedial Design		8%			\$658,475	Percentage from Exhibit 5-8 in EPA 540-R-00-002 was used.
Construction Management		6%			\$493,857	Percentage from Exhibit 5-8 in EPA 540-R-00-002 was used.
<b>TOTAL</b>					\$9,794,822	
<b>TOTAL CAPITAL COST</b>					<b>\$9,795,000</b>	Total capital cost is rounded to the nearest \$1,000.

TABLE CS-G

TABLE CS-G						
Alternative G		DETAILED COST ESTIMATE SUMMARY				
Site:	Portland Harbor Superfund Site	Description:	This alternative evaluates a remedy that would involve dredging of contaminated sediments, disposal of the remaining contaminated sediment at offsite facilities (Subtitle D and Subtitle C/TSCA), capping, enhanced monitored natural recovery (EMNR), in-situ treatment, and monitored natural recovery (MNR). Capital costs are based on Disposed Material Management (DMM) Scenario 2.			
Location:	Portland, Oregon					
Phase:	Draft Feasibility Study (-30% to +50%)					
Base Year:	2015					
Date:	8/12/2015					
TECHNOLOGY ASSIGNMENTS MEASURES CAPITAL Construction COSTS: (Assumed to be Incurred During Years 0 through 17)						
DESCRIPTION	WORKSHEET	QTY	UNIT(S)	UNIT COST	TOTAL	NOTES
Mobilization / Demobilization	CW-G1	1	LS	\$41,014,000	\$41,014,000	
Transload Facility Development	CW-G21	1	LS	\$23,821,875	\$23,821,875	
Debris Removal and Disposal	CW-G5	795	AC	\$13,084	\$10,402,602	
Obstruction Removal and Relocation	CW-G6	1	LS	\$23,371,297	\$23,371,297	
Erosion/Residual Control Measures	CW-G7	1	LS	\$28,134,000	\$28,134,000	
Dredging of Contaminated Sediments (Open Water)	CW-G8	7,295,277	CY	\$38	\$277,402,908	
Dredging of Contaminated Sediments (Confined)	CW-G9	714,179	CY	\$54	\$38,324,631	
Excavation of Contaminated Sediments (From Shore for Riverbanks)	CW-G10	123,581	CY	\$47	\$5,783,591	
Hydraulic Offloading of the Contaminated Sediments	CW-G11	8,133,037	CY	\$6	\$51,238,133	Includes offloading contaminated sediments at the transload facility (for Subtitle C/TSCA or Subtitle D disposal).
Subtitle C/TSCA Disposal (Handling, Transportation, Treatment of Select PTW Materials, and Disposal)	CW-G12	463,227	CY	\$949	\$439,448,143	Includes waste going to offsite Subtitle C/TSCA facility for disposal, including the volume of NRC/NAPL PTW that would require treatment.
Subtitle D Disposal (Handling, Transportation, and Disposal)	CW-G13	7,669,810	CY	\$124	\$954,266,286	Includes waste going to offsite Subtitle D facility for disposal without treatment, including the volume of "concentration"-based PTW (such as DDx and non-TSCA PCBs).
Mitigation	CW-G14	163	AC	\$2,345,690	\$382,347,518	
Sand Placement for Technology Assignments	CW-G15	2,100,036	CY	\$46	\$97,135,735	
Beach Mix Placement for Technology Assignments	CW-G16	70,919	CY	\$93	\$6,598,308	
Armor Placement for Technology Assignments	CW-G17	262,754	CY	\$92	\$24,269,114	
Reactive/GAC Placement for Technology Assignments	CW-G18	21,563	TON	\$8,857	\$190,985,937	
Geofabric for Riverbanks	CW-G19	25	AC	\$14,397	\$359,932	
Organoclay Mat Placement for Technology Assignments	CW-G20	21	AC	\$450,846	\$9,467,767	
SUBTOTAL					\$2,604,371,777	
Contingency (Scope and Bid)		20%			\$520,874,355	10% Scope, 10% Bid (Low end of the recommended range in EPA 540-R-00-002).
SUBTOTAL					\$3,125,246,132	
Project Management		2%			\$62,504,923	Percentage modified as documented in Attachment A.
Remedial Design		2%			\$62,504,923	Percentage modified as documented in Attachment A.
Construction Management		3%			\$93,757,384	Percentage modified as documented in Attachment A.
TOTAL					\$3,344,013,362	
TOTAL CAPITAL COST					\$3,344,013,000	Total capital cost is rounded to the nearest \$1,000.

TABLE CS-G

TABLE CS-G						
Alternative G		DETAILED COST ESTIMATE SUMMARY				
<b>Site:</b>	Portland Harbor Superfund Site	<b>Description:</b>	This alternative evaluates a remedy that would involve dredging of contaminated sediments, disposal of the remaining contaminated sediment at offsite facilities (Subtitle D and Subtitle C/TSCA), capping, enhanced monitored natural recovery (EMNR), in-situ treatment, and monitored natural recovery (MNR). Capital costs are based on Disposed Material Management (DMM) Scenario 2.			
<b>Location:</b>	Portland, Oregon					
<b>Phase:</b>	Draft Feasibility Study (-30% to +50%)					
<b>Base Year:</b>	2015					
<b>Date:</b>	8/12/2015					
SITE-WIDE MONITORING AND MONITORED NATURAL RECOVERY PERIODIC COSTS: (Assumed to be Incurred at Years 2, 4, 6, 8, 10 and Every 4 Years through Period of Analysis)						
<b>DESCRIPTION</b>	<b>WORKSHEET</b>	<b>QTY</b>	<b>UNIT(S)</b>	<b>UNIT COST</b>	<b>TOTAL</b>	<b>NOTES</b>
Monitored Natural Recovery (MNR) for MNR/Enhanced Monitored Natural Recovery (EMNR) and Broadcast GAC Areas	CW-G22	1,864	AC	\$3,680	\$6,859,119	Quantity represents dredge, MNR/EMNR and in situ treatment areas.
Site-Wide Monitoring	CW-G23	1	LS	\$955,960	\$955,960	
Cap Area Monitoring and Reactive Layer Monitoring	CW-G24	1	LS	\$57,287,550	\$57,287,550	
<b>SUBTOTAL</b>					\$65,102,629	
Contingency (Scope and Bid)		20%			\$13,020,526	10% Scope, 10% Bid (Low end of the recommended range in EPA 540-R-00-002).
<b>SUBTOTAL</b>					\$78,123,155	
Project Management		2%			\$1,562,463	Percentage modified as documented in Attachment A.
Technical Support		5%			\$3,906,158	Percentage modified as documented in Attachment A.
<b>TOTAL</b>					\$83,591,776	
<b>TOTAL PERIODIC COST</b>					\$83,592,000	Total periodic cost is rounded to the nearest \$1,000.
LONG TERM OPERATIONS AND MAINTENANCE PERIODIC COSTS: (Assumed to be Incurred at Year 5 and Every 5 Years through Period of Analysis)						
<b>DESCRIPTION</b>	<b>WORKSHEET</b>	<b>QTY</b>	<b>UNIT(S)</b>	<b>UNIT COST</b>	<b>TOTAL</b>	<b>NOTES</b>
Long-Term Maintenance for Capping, EMNR, and In Situ Treatment	CW-G25	1	LS	\$16,702,838	\$16,702,838	Assume 5% of placement of additional material for capping, EMNR and In Situ Treatment. Includes mobilization and demobilization costs.
<b>SUBTOTAL</b>					\$16,702,838	
Contingency (Scope and Bid)		20%			\$3,340,568	10% Scope, 10% Bid (Low end of the recommended range in EPA 540-R-00-002).
<b>SUBTOTAL</b>					\$20,043,406	
Project Management		5%			\$1,002,170	Low end of the recommended range in EPA 540-R-00-002 was used.
Technical Support		10%			\$2,004,341	Low end of the recommended range in EPA 540-R-00-002 was used.
<b>TOTAL</b>					\$23,049,917	
<b>TOTAL PERIODIC COST</b>					\$23,050,000	Total periodic cost is rounded to the nearest \$1,000.

TABLE CS-G

TABLE CS-G						
Alternative		G				
DETAILED COST ESTIMATE SUMMARY						
Site:	Portland Harbor Superfund Site	Description:	This alternative evaluates a remedy that would involve dredging of contaminated sediments, disposal of the remaining contaminated sediment at offsite facilities (Subtitle D and Subtitle C/TSCA), capping, enhanced monitored natural recovery (EMNR), in-situ treatment, and monitored natural recovery (MNR). Capital costs are based on Disposed Material Management (DMM) Scenario 2.			
Location:	Portland, Oregon					
Phase:	Draft Feasibility Study (-30% to +50%)					
Base Year:	2015					
Date:	8/12/2015					
INSTITUTIONAL CONTROLS PERIODIC COSTS: (Assumed to be Incurred at Year 5 and Every 5 Years through Period of Analysis)						
DESCRIPTION	WORKSHEET	QTY	UNIT(S)	UNIT COST	TOTAL	NOTES
Evaluating and Updating Institutional Controls	CW-G3	1	LS	\$218,260	\$218,260	
SUBTOTAL					\$218,260	
Contingency (Scope and Bid)		10%			\$21,826	10% Scope, 0% Bid as documented in Attachment A.
SUBTOTAL					\$240,086	
Project Management		5%			\$12,004	Low end of the recommended range in EPA 540-R-00-002 was used.
Technical Support		10%			\$24,009	Low end of the recommended range in EPA 540-R-00-002 was used.
TOTAL					\$276,099	
TOTAL PERIODIC COST					\$276,000	Total periodic cost is rounded to the nearest \$1,000.
5-YEAR SITE REVIEW PERIODIC COSTS: (Assumed to be Incurred at Year 5 and Every 5 Years through Period of Analysis)						
DESCRIPTION	WORKSHEET	QTY	UNIT(S)	UNIT COST	TOTAL	NOTES
5-Year Site Review	CW-G26	1	LS	\$243,666	\$243,666	
SUBTOTAL					\$243,666	
Contingency (Scope and Bid)		10%			\$24,367	10% Scope, 0% Bid as documented in Attachment A.
SUBTOTAL					\$268,033	
Project Management		5%			\$13,402	Low end of the recommended range in EPA 540-R-00-002 was used.
Technical Support		10%			\$26,803	Low end of the recommended range in EPA 540-R-00-002 was used.
TOTAL					\$308,238	
TOTAL PERIODIC COST					\$308,000	Total periodic cost is rounded to the nearest \$1,000.

**Notes:**

Percentages used for contingency and professional/technical services costs are based on guidance from Section 5.0 of "A Guide to Developing and Documenting Cost Estimates During the Feasibility Study", EPA 2000. Modifications to the percentages applied for contingency and professional/technical services are documented in Attachment A.

Costs presented for this alternative are expected to have an accuracy between -30% to +50% of actual costs, based on the scope presented. They are prepared solely to facilitate relative comparisons between alternatives for FS evaluation purposes.

**Abbreviations:**

AC	Acre
CY	Cubic Yard
LS	Lump Sum
QTY	Quantity
TON	Ton

**Cost Worksheets**  
**Alternative B**



TABLE CW-B1

<div style="display: flex; justify-content: space-between;"> <div> <b>Alternative B</b>  <b>Capital Cost Sub-Element</b>  <b>Mobilization / Demobilization</b> </div> <div> <b>Cost Worksheet: CW-B1</b> </div> <div> <b style="font-size: 1.2em;">COST WORKSHEET</b> </div> </div>																																																																					
<b>Site:</b> Portland Harbor Superfund Site <b>Location:</b> Portland, Oregon <b>Phase:</b> Draft Feasibility Study <b>Base Year:</b> 2015												<b>Prepared By:</b> AB <b>Checked By:</b> JN		<b>Date:</b> 8/11/2015 <b>Date:</b> 8/12/2015																																																							
<b>Work Statement:</b> This sub-element involves mobilization and demobilization of all the required equipment to and from the site respectively.																																																																					
<b>Cost Analysis:</b> Cost for Mobilization/Demobilization (Lump Sum)																																																																					
COST DATABASE CODE	DESCRIPTION	QTY	UNIT(S)	HPF	LABOR	ADJ LABOR	EQUIP	ADJ EQUIP	MATL	OTHER	UNMOD UC	UNMOD LIC	PC OH	PC PF	BUR LIC	COST SOURCE CITATION	COMMENTS																																																				
M15	Mobilization/Demobilization	1	LS	1.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$8,449,000.00	\$8,449,000.00	\$8,449,000.00	0%	0%	\$8,449,000	A Previous Work	Assumes 1.6% of total capital costs per Lower Duwamish. See Calculations for derivation.																																																				
												<b>TOTAL UNIT COST:</b>		\$8,449,000																																																							
<div style="display: flex;"> <div style="flex: 1;"> <b>Notes:</b>            HTRW productivity factor is from Exhibit B-3 or B-4 of "A Guide to Developing and Documenting Cost Estimates During the Feasibility Study", EPA 2000            The Cost Database Code is a reference code for linking with line item cost information with the cost source database and is not otherwise used within these cost worksheets.   <b>Source of Cost Data:</b>            NA Not Applicable - costs are from previous work or vendor quote            For citation references, the following sources apply:            MII (MII Assemblies), GSA (www.gsa.gov), FLC (www.flcdatcenter.com), A (Allowance), V (Vendor Quote), CW (Means CostWorks 2015), P (Previous Work), and FRTR (www.frtr.gov)         </div> <div style="flex: 1;"> <b>Abbreviations:</b>  <table style="width: 100%; font-size: 0.8em;"> <tr><td>QTY</td><td>Quantity</td><td>ACR</td><td>Acre</td></tr> <tr><td>EQUIP</td><td>Equipment</td><td>BCY</td><td>Bank Cubic Yard</td></tr> <tr><td>MATL</td><td>Material</td><td>CLF</td><td>100 Linear Foot</td></tr> <tr><td>HPF</td><td>HTRW Productivity Factor</td><td>DY</td><td>Days</td></tr> <tr><td>ADJ LABOR</td><td>Adjusted Labor for HFP</td><td>EA</td><td>Each</td></tr> <tr><td>ADJ EQUIP</td><td>Adjusted Equipment for HFP</td><td>LF</td><td>Linear Foot</td></tr> <tr><td>UNMOD UC</td><td>Unmodified Unit Cost</td><td>HR</td><td>Hours</td></tr> <tr><td>UNMOD LIC</td><td>Unmodified Line Item Cost</td><td>LB</td><td>Pounds</td></tr> <tr><td>UNBUR LIC</td><td>Unburdened Line Item Cost</td><td>LCY</td><td>Loose Cubic Yard</td></tr> <tr><td>PC OH</td><td>Prime Contractor Overhead</td><td>LS</td><td>Lump Sum</td></tr> <tr><td>PC PF</td><td>Prime Contractor Profit</td><td>RL</td><td>Roll</td></tr> <tr><td>BUR LIC</td><td>Burdened Line Item Cost</td><td>SY</td><td>Square Yard</td></tr> <tr><td></td><td></td><td>TN</td><td>Tons</td></tr> </table> </div> </div>																		QTY	Quantity	ACR	Acre	EQUIP	Equipment	BCY	Bank Cubic Yard	MATL	Material	CLF	100 Linear Foot	HPF	HTRW Productivity Factor	DY	Days	ADJ LABOR	Adjusted Labor for HFP	EA	Each	ADJ EQUIP	Adjusted Equipment for HFP	LF	Linear Foot	UNMOD UC	Unmodified Unit Cost	HR	Hours	UNMOD LIC	Unmodified Line Item Cost	LB	Pounds	UNBUR LIC	Unburdened Line Item Cost	LCY	Loose Cubic Yard	PC OH	Prime Contractor Overhead	LS	Lump Sum	PC PF	Prime Contractor Profit	RL	Roll	BUR LIC	Burdened Line Item Cost	SY	Square Yard			TN	Tons
QTY	Quantity	ACR	Acre																																																																		
EQUIP	Equipment	BCY	Bank Cubic Yard																																																																		
MATL	Material	CLF	100 Linear Foot																																																																		
HPF	HTRW Productivity Factor	DY	Days																																																																		
ADJ LABOR	Adjusted Labor for HFP	EA	Each																																																																		
ADJ EQUIP	Adjusted Equipment for HFP	LF	Linear Foot																																																																		
UNMOD UC	Unmodified Unit Cost	HR	Hours																																																																		
UNMOD LIC	Unmodified Line Item Cost	LB	Pounds																																																																		
UNBUR LIC	Unburdened Line Item Cost	LCY	Loose Cubic Yard																																																																		
PC OH	Prime Contractor Overhead	LS	Lump Sum																																																																		
PC PF	Prime Contractor Profit	RL	Roll																																																																		
BUR LIC	Burdened Line Item Cost	SY	Square Yard																																																																		
		TN	Tons																																																																		
<div style="display: flex;"> <div style="flex: 1;"> <b>Cost Adjustment Checklist:</b>            FACTOR:            H&amp;S Productivity (labor and equipment only)            Escalation to Base Year            Area Cost Factor            Subcontractor Overhead and Profit            Prime Contractor Overhead and Profit         </div> <div style="flex: 1;"> <b>NOTES:</b>            Field work will be in Level "D" PPE.            MII assembly costs include HPF adjustments.            2015 cost sources are not escalated (EF=1.00). All other costs are escalated based on the USACE CWCCIS, EM 1110-2-1304, Mar 2015.            An AF of 1.05 is used for Oregon, except that an AF of 1.00 (national unmodified average) is used for MII assembly costs and local vendor quotes.            It is assumed that home office OH is 8% and profit is 9% for the Prime Contractor. Professional labor overhead is 100%. Allowances and items with mandated costs such as per diem do not have overhead and profit applied.            Items previously developed by Anchor QEA (2010) already include contractor markups, therefore overhead and profit were not applied to those items.            It is assumed that OH is 1% and profit is 0% for vendor quotes for treatment and disposal at offsite disposal facilities. It is assumed that OH is 5% and profit is 0% for quotes for all other material vendor quotes.         </div> </div>																																																																					

TABLE CW-B2

Alternative B  
Capital Cost Sub-Element  
Institutional Controls

Cost Worksheet: CW-B2

COST WORKSHEET

Site: Portland Harbor Superfund Site  
Location: Portland, Oregon  
Phase: Draft Feasibility Study  
Base Year: 2015

Prepared By: JN  
Checked By: AS  
Date: 7/27/2015  
Date: 7/28/2015

**Work Statement:**  
This sub-element involves implementation of institutional controls for the site. The following cost includes labor and materials to develop legal documents for institutional controls and cost for document submission and recording.

**Cost Analysis:**  
Cost for Institutional Controls (Lump Sum)

COST DATABASE CODE	DESCRIPTION	QTY	UNIT(S)	HPF	LABOR	ADJ LABOR	EQUIP	ADJ EQUIP	MATL	OTHER	UNMOD UC	UNMOD LIC	PC OH	PC PF	BUR LIC	COST SOURCE CITATION	COMMENTS
	Informational Devices - Fish Consumption Advisory																
L11	Project Manager	800	HR	1.00	\$82.17	\$82.17	\$0.00	\$0.00	\$0.00	\$0.00	\$82.17	\$65,736.00	100%	9%	\$143,304	FLC FLCDataCenter	
L4	Environmental Engineer	500	HR	1.00	\$48.91	\$48.91	\$0.00	\$0.00	\$0.00	\$0.00	\$48.91	\$24,455.00	100%	9%	\$53,312	FLC FLCDataCenter	
L6	Environmental Scientist	800	HR	1.00	\$37.70	\$37.70	\$0.00	\$0.00	\$0.00	\$0.00	\$37.70	\$30,160.00	100%	9%	\$65,749	FLC FLCDataCenter	
L3	Clerks, Typist, Bookkeeper & Receptionist	300	HR	1.00	\$19.89	\$19.89	\$0.00	\$0.00	\$0.00	\$0.00	\$19.89	\$5,967.00	100%	9%	\$13,008	FLC FLCDataCenter	
L5	Environmental Lawyer	150	HR	1.00	\$71.72	\$71.72	\$0.00	\$0.00	\$0.00	\$0.00	\$71.72	\$10,758.00	100%	9%	\$23,452	FLC FLCDataCenter	
L13	Paralegal	300	HR	1.00	\$29.56	\$29.56	\$0.00	\$0.00	\$0.00	\$0.00	\$29.56	\$8,868.00	100%	9%	\$19,332	FLC FLCDataCenter	
	Informational Devices - Regulated Navigation Area (RNA) Setup																
L11	Project Manager	150	HR	1.00	\$82.17	\$82.17	\$0.00	\$0.00	\$0.00	\$0.00	\$82.17	\$12,325.50	100%	9%	\$26,870	FLC FLCDataCenter	
L4	Environmental Engineer	100	HR	1.00	\$48.91	\$48.91	\$0.00	\$0.00	\$0.00	\$0.00	\$48.91	\$4,891.00	100%	9%	\$10,662	FLC FLCDataCenter	
L5	Environmental Lawyer	80	HR	2.00	\$71.72	\$35.86	\$0.00	\$0.00	\$0.00	\$0.00	\$35.86	\$2,868.80	100%	9%	\$6,254	FLC FLCDataCenter	
L13	Paralegal	160	HR	1.00	\$29.56	\$29.56	\$0.00	\$0.00	\$0.00	\$0.00	\$29.56	\$4,729.60	100%	9%	\$10,311	FLC FLCDataCenter	
A1	18' Boat	80	HR	1.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$28.02	\$28.02	\$2,241.60	8%	9%	\$2,639	MII MII Assembly	For buoy setup
L17	Boat Operator	80	HR	1.00	\$33.16	\$33.16	\$0.00	\$0.00	\$0.00	\$0.00	\$33.16	\$2,652.80	100%	9%	\$5,783	FLC FLCDataCenter	
L8	Field Technician	80	HR	1.00	\$31.42	\$31.42	\$0.00	\$0.00	\$0.00	\$0.00	\$31.42	\$2,513.60	100%	9%	\$5,480	FLC FLCDataCenter	
M21	Buoy	120	EA	1.00	\$0.00	\$0.00	\$0.00	\$0.00	\$421.76	\$0.00	\$421.76	\$50,611.20	5%	0%	\$53,142	V Vendor Quote	Quote - Go2Marine
	Proprietary Controls																
L5	Environmental Lawyer	200	HR	1.00	\$71.72	\$71.72	\$0.00	\$0.00	\$0.00	\$0.00	\$71.72	\$14,344.00	100%	9%	\$31,270	FLC FLCDataCenter	
L13	Paralegal	250	HR	1.00	\$29.56	\$29.56	\$0.00	\$0.00	\$0.00	\$0.00	\$29.56	\$7,390.00	100%	9%	\$16,110	FLC FLCDataCenter	
L3	Clerks, Typist, Bookkeeper & Receptionist	150	HR	1.00	\$19.89	\$19.89	\$0.00	\$0.00	\$0.00	\$0.00	\$19.89	\$2,983.50	100%	9%	\$6,504	FLC FLCDataCenter	
	Enforcement Tools																
L5	Environmental Lawyer	4,200	HR	1.00	\$71.72	\$71.72	\$0.00	\$0.00	\$0.00	\$0.00	\$71.72	\$301,224.00	100%	9%	\$656,668	FLC FLCDataCenter	
L13	Paralegal	5,250	HR	1.00	\$29.56	\$29.56	\$0.00	\$0.00	\$0.00	\$0.00	\$29.56	\$155,190.00	100%	9%	\$338,314	FLC FLCDataCenter	
L3	Clerks, Typist, Bookkeeper & Receptionist	2,100	HR	1.00	\$19.89	\$19.89	\$0.00	\$0.00	\$0.00	\$0.00	\$19.89	\$41,769.00	100%	9%	\$91,056	FLC FLCDataCenter	
TOTAL UNIT COST:															\$1,579,220		

**Notes:**  
HTRW productivity factor is from Exhibit B-3 or B-4 of "A Guide to Developing and Documenting Cost Estimates During the Feasibility Study", EPA 2000  
The Cost Database Code is a reference code for linking with line item cost information with the cost source database and is not otherwise used within these cost worksheets.

**Source of Cost Data:**  
NA Not Applicable - costs are from previous work or vendor quote  
For citation references, the following sources apply:  
MII (MII Assemblies), GSA (www.gsa.gov), FLC (www.flcdatacenter.com), A (Allowance), V (Vendor Quote), CW (Means CostWorks 2015), P (Previous Work), and FRTR (www.frtr.gov)

**Cost Adjustment Checklist:**  
FACTOR: Field work will be in Level "D" PPE.  
H&S Productivity (labor and equipment only) MII assembly costs include HPF adjustments.  
Escalation to Base Year 2015 cost sources are not escalated (EF=1.00). All other costs are escalated based on the USACE WCCIS, EM 1110-2-1304, Mar 2015.  
Area Cost Factor An AF of 1.05 is used for Oregon, except that an AF of 1.00 (national unmodified average) is used for MII assembly costs and local vendor quotes.  
Subcontractor Overhead and Profit It is assumed that home office OH is 8% and profit is 9% for the Prime Contractor. Professional labor overhead is 100%. Allowances and items with mandated costs such as per diem do not have overhead and profit applied.  
Prime Contractor Overhead and Profit Items previously developed by Anchor QEA (2010) already include contractor markups, therefore overhead and profit were not applied to those items.  
It is assumed that OH is 1% and profit is 0% for vendor quotes for treatment and disposal at offsite disposal facilities. It is assumed that OH is 5% and profit is 0% for quotes for all other material vendor quotes.

**Abbreviations:**  
QTY Quantity ACR Acres  
EQUIP Equipment BCY Bank Cubic Yard  
MATL Material CLF 100 Linear Foot  
HPF HTRW Productivity Factor DY Days  
ADJ LABOR Adjusted Labor for HFP EA Each  
ADJ EQUIP Adjusted Equipment for HFP LF Linear Foot  
UNMOD UC Unmodified Unit Cost HR Hours  
UNMOD LIC Unmodified Line Item Cost LB Pounds  
UNBUR LIC Unburdened Line Item Cost LCY Loose Cubic Yard  
PC OH Prime Contractor Overhead LS Lump Sum  
PC PF Prime Contractor Profit RL Roll  
BUR LIC Burdened Line Item Cost SY Square Yard  
TN Tons

TABLE CW-B3

Alternative B Cost Worksheet: CW-B3

## Capital Cost Sub-Element

## Evaluating and Updating Institutional Controls

## COST WORKSHEET

Site: Portland Harbor Superfund Site  
 Location: Portland, Oregon  
 Phase: Draft Feasibility Study  
 Base Year: 2015

Prepared By: JN Date: 7/27/2015

Checked By: AS Date: 7/28/2015

## Work Statement:

This sub-element involves evaluating and updating of institutional controls for the site. The following cost includes labor and materials to required for evaluating and updating institutional controls every 5 years.

## Cost Analysis:

Cost for Evaluating and Updating Institutional Controls (Lump Sum)

COST DATABASE CODE	DESCRIPTION	QTY	UNIT(S)	HPF	LABOR	ADJ LABOR	EQUIP	ADJ EQUIP	MATL	OTHER	UNMOD UC	UNMOD LIC	PC OH	PC PF	BUR LIC	COST SOURCE CITATION	COMMENTS
	Informational Devices - Fish Consumption Advisory																
L11	Project Manager	80	HR	1.00	\$82.17	\$82.17	\$0.00	\$0.00	\$0.00	\$0.00	\$82.17	\$6,573.60	100%	9%	\$14,330	FLC FLCDataCenter	Assumes 10% of initial costs for updating periodically
L4	Environmental Engineer	50	HR	1.00	\$48.91	\$48.91	\$0.00	\$0.00	\$0.00	\$0.00	\$48.91	\$2,445.50	100%	9%	\$5,331	FLC FLCDataCenter	Assumes 10% of initial costs for updating periodically
L6	Environmental Scientist	80	HR	1.00	\$37.70	\$37.70	\$0.00	\$0.00	\$0.00	\$0.00	\$37.70	\$3,016.00	100%	9%	\$6,575	FLC FLCDataCenter	Assumes 10% of initial costs for updating periodically
L3	Clerks, Typist, Bookkeeper & Receptionist	30	HR	1.00	\$19.89	\$19.89	\$0.00	\$0.00	\$0.00	\$0.00	\$19.89	\$596.70	100%	9%	\$1,301	FLC FLCDataCenter	Assumes 10% of initial costs for updating periodically
L5	Environmental Lawyer	15	HR	1.00	\$71.72	\$71.72	\$0.00	\$0.00	\$0.00	\$0.00	\$71.72	\$1,075.80	100%	9%	\$2,345	FLC FLCDataCenter	Assumes 10% of initial costs for updating periodically
L13	Paralegal	30	HR	1.00	\$29.56	\$29.56	\$0.00	\$0.00	\$0.00	\$0.00	\$29.56	\$886.80	100%	9%	\$1,933	FLC FLCDataCenter	Assumes 10% of initial costs for updating periodically
	Informational Devices - Regulated Navigation Area (RNA) Setup																
L11	Project Manager	15	HR	1.00	\$82.17	\$82.17	\$0.00	\$0.00	\$0.00	\$0.00	\$82.17	\$1,232.55	100%	9%	\$2,687	FLC FLCDataCenter	Assumes 10% of initial costs for updating periodically
L4	Environmental Engineer	10	HR	1.00	\$48.91	\$48.91	\$0.00	\$0.00	\$0.00	\$0.00	\$48.91	\$489.10	100%	9%	\$1,066	FLC FLCDataCenter	Assumes 10% of initial costs for updating periodically
L5	Environmental Lawyer	8	HR	2.00	\$71.72	\$35.86	\$0.00	\$0.00	\$0.00	\$0.00	\$35.86	\$286.88	100%	9%	\$625	FLC FLCDataCenter	Assumes 10% of initial costs for updating periodically
L13	Paralegal	16	HR	1.00	\$29.56	\$29.56	\$0.00	\$0.00	\$0.00	\$0.00	\$29.56	\$472.96	100%	9%	\$1,031	FLC FLCDataCenter	Assumes 10% of initial costs for updating periodically
A1	18' Boat	80	HR	1.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$28.02	\$28.02	\$2,241.60	8%	9%	\$2,639	MII MII Assembly	For buoy setup
L17	Boat Operator	80	HR	1.00	\$33.16	\$33.16	\$0.00	\$0.00	\$0.00	\$0.00	\$33.16	\$2,652.80	100%	9%	\$5,783	FLC FLCDataCenter	
L8	Field Technician	80	HR	1.00	\$31.42	\$31.42	\$0.00	\$0.00	\$0.00	\$0.00	\$31.42	\$2,513.60	100%	9%	\$5,480	FLC FLCDataCenter	
M21	Buoy	120	EA	1.00	\$0.00	\$0.00	\$0.00	\$0.00	\$421.76	\$0.00	\$421.76	\$50,611.20	5%	0%	\$53,142	V Vendor Quote	Quote - Go2Marine
	Proprietary Controls																
L5	Environmental Lawyer	20	HR	1.00	\$71.72	\$71.72	\$0.00	\$0.00	\$0.00	\$0.00	\$71.72	\$1,434.40	100%	9%	\$3,127	FLC FLCDataCenter	Assumes 10% of initial costs for updating periodically
L13	Paralegal	25	HR	1.00	\$29.56	\$29.56	\$0.00	\$0.00	\$0.00	\$0.00	\$29.56	\$739.00	100%	9%	\$1,611	FLC FLCDataCenter	Assumes 10% of initial costs for updating periodically
L3	Clerks, Typist, Bookkeeper & Receptionist	15	HR	1.00	\$19.89	\$19.89	\$0.00	\$0.00	\$0.00	\$0.00	\$19.89	\$298.35	100%	9%	\$650	FLC FLCDataCenter	Assumes 10% of initial costs for updating periodically
	Enforcement Tools																
L5	Environmental Lawyer	420	HR	1.00	\$71.72	\$71.72	\$0.00	\$0.00	\$0.00	\$0.00	\$71.72	\$30,122.40	100%	9%	\$65,667	FLC FLCDataCenter	Assumes 10% of initial costs for updating periodically
L13	Paralegal	525	HR	1.00	\$29.56	\$29.56	\$0.00	\$0.00	\$0.00	\$0.00	\$29.56	\$15,519.00	100%	9%	\$33,831	FLC FLCDataCenter	Assumes 10% of initial costs for updating periodically
L3	Clerks, Typist, Bookkeeper & Receptionist	210	HR	1.00	\$19.89	\$19.89	\$0.00	\$0.00	\$0.00	\$0.00	\$19.89	\$4,176.90	100%	9%	\$9,106	FLC FLCDataCenter	Assumes 10% of initial costs for updating periodically
TOTAL UNIT COST:															\$218,260		

## Notes:

HTRW productivity factor is from Exhibit B-3 or B-4 of "A Guide to Developing and Documenting Cost Estimates During the Feasibility Study", EPA 2000

The Cost Database Code is a reference code for linking with line item cost information with the cost source database and is not otherwise used within these cost worksheets.

## Source of Cost Data:

NA Not Applicable - costs are from previous work or vendor quote

For citation references, the following sources apply:

MII (MII Assemblies), GSA (www.gsa.gov), FLC (www.flcdatacenter.com), A (Allowance), V (Vendor Quote), CW (Means CostWorks 2015), P (Previous Work), and FRTR (www.frtr.gov)

## Cost Adjustment Checklist:

FACTOR:  
 H&S Productivity (labor and equipment only)  
 Escalation to Base Year  
 Area Cost Factor  
 Subcontractor Overhead and Profit  
 Prime Contractor Overhead and Profit

## NOTES:

Field work will be in Level "D" PPE.

MII assembly costs include HPF adjustments.

2015 cost sources are not escalated (EF=1.00). All other costs are escalated based on the USACE WCWCIS, EM 1110-2-1304, Mar 2015.

An AF of 1.05 is used for Oregon, except that an AF of 1.00 (national unmodified average) is used for MII assembly costs and local vendor quotes.

It is assumed that home office OH is 8% and profit is 9% for the Prime Contractor. Professional labor overhead is 100%. Allowances and items with mandated costs such as per diem do not have overhead and profit applied.

Items previously developed by Anchor QEA (2010) already include contractor markups, therefore overhead and profit were not applied to those items.

It is assumed that OH is 1% and profit is 0% for vendor quotes for treatment and disposal at offsite disposal facilities. It is assumed that OH is 5% and profit is 0% for quotes for all other material vendor quotes.

## Abbreviations:

QTY	Quantity	ACR	Acre
EQUIP	Equipment	BCY	Bank Cubic Yard
MATL	Material	CLF	100 Linear Foot
HPF	HTRW Productivity Factor	DY	Days
ADJ LABOR	Adjusted Labor for HPF	EA	Each
ADJ EQUIP	Adjusted Equipment for HPF	LF	Linear Foot
UNMOD UC	Unmodified Unit Cost	HR	Hours
UNMOD LIC	Unmodified Line Item Cost	LB	Pounds
UNBUR LIC	Unburdened Line Item Cost	LCY	Loose Cubic Yard
PC OH	Prime Contractor Overhead	LS	Lump Sum
PC PF	Prime Contractor Profit	RL	Roll
BUR LIC	Burdened Line Item Cost	SY	Square Yard
		TN	Tons

TABLE CW-B5

TABLE CW-B5																			
<b>Alternative B</b> <b>Capital Cost Sub-Element</b> <b>Debris Removal and Disposal</b>										<b>Cost Worksheet: CW-B5</b>					<b>COST WORKSHEET</b>				
<b>Site:</b> Portland Harbor Superfund Site <b>Location:</b> Portland, Oregon <b>Phase:</b> Draft Feasibility Study <b>Base Year:</b> 2015										<b>Prepared By:</b> JN  <b>Checked By:</b> AS					<b>Date:</b> 7/27/2015  <b>Date:</b> 7/28/2015				
<b>Work Statement:</b> This sub-element involves removal and disposal of debris for all areas prior to remedial activities. It includes costs for on-site labor, equipment, and materials developed from previous work.																			
<b>Cost Analysis:</b> Cost for Debris Removal and Disposal (Lump Sum)																			
COST DATABASE CODE	DESCRIPTION	QTY	UNIT(S)	HPF	LABOR	ADJ LABOR	EQUIP	ADJ EQUIP	MATL	OTHER	UNMOD UC	UNMOD LIC	PC OH	PC PF	BUR LIC	COST SOURCE CITATION	COMMENTS		
P9	Debris Removal and Disposal	199.9	AC	1.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$13,083.75	\$13,083.75	\$2,615,441.63	0%	0%	\$2,615,442	P Previous Work	Developed by Anchor QEA (2010)		
												TOTAL UNIT COST:		\$2,615,442					
<b>Notes:</b> HTRW productivity factor is from Exhibit B-3 or B-4 of "A Guide to Developing and Documenting Cost Estimates During the Feasibility Study", EPA 2000 The Cost Database Code is a reference code for linking with line item cost information with the cost source database and is not otherwise used within these cost worksheets.																			
<b>Source of Cost Data:</b> NA Not Applicable - costs are from previous work or vendor quote For citation references, the following sources apply: MII (MII Assemblies), GSA (www.gsa.gov), FLC (www.flcdatcenter.com), A (Allowance), V (Vendor Quote), CW (Means CostWorks 2015), P (Previous Work), and FRTR (www.frtr.gov)										<b>Abbreviations:</b> QTY Quantity EQUIP Equipment MATL Material HPF HTRW Productivity Factor ADJ LABOR Adjusted Labor for HFP ADJ EQUIP Adjusted Equipment for HFP UNMOD UC Unmodified Unit Cost UNMOD LIC Unmodified Line Item Cost UNBUR LIC Unburdened Line Item Cost PC OH Prime Contractor Overhead PC PF Prime Contractor Profit BUR LIC Burdened Line Item Cost									
<b>Cost Adjustment Checklist:</b> FACTOR: H&S Productivity (labor and equipment only) Escalation to Base Year Area Cost Factor Subcontractor Overhead and Profit Prime Contractor Overhead and Profit										<b>NOTES:</b> Field work will be in Level "D" PPE. MII assembly costs include HPF adjustments. 2015 cost sources are not escalated (EF=1.00). All other costs are escalated based on the USACE CWCCIS, EM 1110-2-1304, Mar 2015. An AF of 1.05 is used for Oregon, except that an AF of 1.00 (national unmodified average) is used for MII assembly costs and local vendor quotes. It is assumed that home office OH is 8% and profit is 9% for the Prime Contractor. Professional labor overhead is 100%. Allowances and items with mandated costs such as per diem do not have overhead and profit applied. Items previously developed by Anchor QEA (2010) already include contractor markups, therefore overhead and profit were not applied to those items. It is assumed that OH is 1% and profit is 0% for vendor quotes for treatment and disposal at offsite disposal facilities. It is assumed that OH is 5% and profit is 0% for quotes for all other material vendor quotes.									
										ACR Acres BCY Bank Cubic Yard CLF 100 Linear Foot DY Days EA Each LF Linear Foot HR Hours LB Pounds LCY Loose Cubic Yard LS Lump Sum RL Roll SY Square Yard TN Tons									

TABLE CW-B6

TABLE CW-B6																			
<b>Alternative B</b> <b>Capital Cost Sub-Element</b> <b>Obstruction Removal and Relocation</b>										<b>Cost Worksheet: CW-B6</b>					<b>COST WORKSHEET</b>				
<b>Site:</b> Portland Harbor Superfund Site <b>Location:</b> Portland, Oregon <b>Phase:</b> Draft Feasibility Study <b>Base Year:</b> 2015										<b>Prepared By:</b> JN  <b>Checked By:</b> AS					<b>Date:</b> 7/27/2015  <b>Date:</b> 7/28/2015				
<b>Work Statement:</b> This sub-element involves all work related to obstructions removal, relocation, and disposal. It includes all costs for labor, equipment and materials developed from previous work for pile removal and disposal, pile replacement, and temporary dock relocation.																			
<b>Cost Analysis:</b> Cost for Obstructions (Lump Sum)																			
COST DATABASE CODE	DESCRIPTION	QTY	UNIT(S)	HPF	LABOR	ADJ LABOR	EQUIP	ADJ EQUIP	MATL	OTHER	UNMOD UC	UNMOD LIC	PC OH	PC PF	BUR LIC	COST SOURCE CITATION	COMMENTS		
P10	Pile Removal and Disposal	330	EA	1.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$714.38	\$714.38	\$235,743.75	0%	0%	\$235,744	P	Previous Work	Developed by Anchor QEA (2010)	
P11	Pile Replacement	330	EA	1.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$7,465.50	\$7,465.50	\$2,463,615.00	0%	0%	\$2,463,615	P	Previous Work	Developed by Anchor QEA (2010)	
P12	Temporary Dock Relocation	8	EA	1.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$100,319.63	\$100,319.63	\$802,557.00	0%	0%	\$802,557	P	Previous Work	Developed by Anchor QEA (2010)	
TOTAL UNIT COST:															\$3,501,916				
<b>Notes:</b> HTRW productivity factor is from Exhibit B-3 or B-4 of "A Guide to Developing and Documenting Cost Estimates During the Feasibility Study", EPA 2000 The Cost Database Code is a reference code for linking with line item cost information with the cost source database and is not otherwise used within these cost worksheets.																			
<b>Source of Cost Data:</b> NA Not Applicable - costs are from previous work or vendor quote For citation references, the following sources apply: MII (MII Assemblies), GSA (www.gsa.gov), FLC (www.flcdatcenter.com), A (Allowance), V (Vendor Quote), CW (Means CostWorks 2015), P (Previous Work), and FRTR (www.frtr.gov)										<b>Abbreviations:</b> QTY Quantity EQUIP Equipment MATL Material HPF HTRW Productivity Factor ADJ LABOR Adjusted Labor for HFP ADJ EQUIP Adjusted Equipment for HFP UNMOD UC Unmodified Unit Cost UNMOD LIC Unmodified Line Item Cost UNBUR LIC Unburdened Line Item Cost PC OH Prime Contractor Overhead PC PF Prime Contractor Profit BUR LIC Burdened Line Item Cost									
<b>Cost Adjustment Checklist:</b> FACTOR: H&S Productivity (labor and equipment only) Escalation to Base Year Area Cost Factor Subcontractor Overhead and Profit Prime Contractor Overhead and Profit										<b>NOTES:</b> Field work will be in Level "D" PPE. MII assembly costs include HPF adjustments. 2015 cost sources are not escalated (EF=1.00). All other costs are escalated based on the USACE CWCCIS, EM 1110-2-1304, Mar 2015. An AF of 1.05 is used for Oregon, except that an AF of 1.00 (national unmodified average) is used for MII assembly costs and local vendor quotes. It is assumed that home office OH is 8% and profit is 9% for the Prime Contractor. Professional labor overhead is 100%. Allowances and items with mandated costs such as per diem do not have overhead and profit applied. Items previously developed by Anchor QEA (2010) already include contractor markups, therefore overhead and profit were not applied to those items. It is assumed that OH is 1% and profit is 0% for vendor quotes for treatment and disposal at offsite disposal facilities. It is assumed that OH is 5% and profit is 0% for quotes for all other material vendor quotes.									
										ACR Acres BCY Bank Cubic Yard CLF 100 Linear Foot DY Days EA Each LF Linear Foot HR Hours LB Pounds LCY Loose Cubic Yard LS Lump Sum RL Roll SY Square Yard TN Tons									

TABLE CW-B7

Alternative B	Cost Worksheet:	CW-B7
---------------	-----------------	-------

Capital Cost Sub-Element	<b>COST WORKSHEET</b>
Erosion/Residual Control Measures	

<b>Site:</b>	Portland Harbor Superfund Site	<b>Prepared By:</b>	JN	<b>Date:</b>	7/27/2015
<b>Location:</b>	Portland, Oregon				
<b>Phase:</b>	Draft Feasibility Study	<b>Checked By:</b>	AS	<b>Date:</b>	7/28/2015
<b>Base Year:</b>	2015				

Work Statement:

This sub-element involves the installation, maintenance, and removal of silt curtains and sheet pile walls for erosion and residual control. It includes costs for on-site labor, equipment, and materials developed from previous work.

**Cost Analysis:**

Cost for Erosion/Residual Control Measures (Lump Sum)

COST DATABASE CODE	DESCRIPTION	QTY	UNIT(S)	HPF	LABOR	ADJ LABOR	EQUIP	ADJ EQUIP	MATL	OTHER	UNMOD UC	UNMOD LIC	PC OH	PC PF	BUR LIC	COST SOURCE CITATION	COMMENTS
P13	Purchase, Install and Maintain Silt Curtains	17,500	LF	1.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$96.75	\$96.75	\$1,693,125.00	0%	0%	\$1,693,125	P Previous Work	Developed by Anchor QEA (2010)
P14	Purchase, Install and Remove Sheet Pile Walls	7,500	LF	1.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$2,745.00	\$2,745.00	\$20,587,500.00	0%	0%	\$20,587,500	P Previous Work	Developed by Anchor QEA (2010)
<b>TOTAL UNIT COST:</b>															\$22,280,625		

Notes: \_\_\_\_\_ Abbreviations: \_\_\_\_\_

HTRW productivity factor is from Exhibit B-3 or B-4 of "A Guide to Developing and Documenting Cost Estimates During the Feasibility Study", EPA 2000					
The Cost Database Code is a reference code for linking with the cost source information with the cost source database and is not otherwise used within these cost worksheets.		QTY	Quantity	ACR	Acres
		EQUIP	Equipment	BCY	Bank Cubic Yard

<b>Source of Cost Data:</b>	HPF	HTRW Productivity Factor	DY	Days
-----------------------------	-----	--------------------------	----	------

NA	Not Applicable - costs are from previous work or vendor quote	ADJ LABOR	Adjusted Labor for HFP	EA	Each
----	---	-----------	------------------------	----	------

For citation references, the following sources apply:

Mil (Mil Assemblies), GSA ( <a href="http://www.gsa.gov">www.gsa.gov</a> ), FLC ( <a href="http://www.flcdatcenter.com">www.flcdatcenter.com</a> ), A (Allowance), V (Vendor Quote), CW (Means CostWorks 2015), P (Previous Work), and FRTR ( <a href="http://www.frtr.gov">www.frtr.gov</a> )	UNMOD UC	Unmodified Unit Cost	HR	Hours
--	----------	----------------------	----	-------

<u>Cost Adjustment Checklist:</u>	<u>NOTES:</u>	UNBUR LIC	Unburdened Line Item Cost	LCY	Loose Cubic Yard
-----------------------------------	---------------	-----------	---------------------------	-----	------------------

<u>Cost Adjustment Checklist:</u>	<u>NOTES:</u>	UNBUR LIC	Unburdened Line Item Cost	LCY	Loose Cubic Yard
-----------------------------------	---------------	-----------	---------------------------	-----	------------------

FACTOR:	Field work will be in Level "D" PPE.	PC OH	Prime Contractor Overhead	LS	Lump Sum
---------	--------------------------------------	-------	---------------------------	----	----------

H&S Productivity (labor and equipment only)	MII assembly costs include HPF adjustments.	PC PF	Prime Contractor Profit	RL	Roll
---	---	-------	-------------------------	----	------

Escalation to Base Year	2015 cost sources are not escalated (EF=1.00). All other costs are escalated based on the USACE CWCCIS, EM 1110-2-1304, Mar 2015.	BUR LIC	Burdened Line Item Cost	SY	Square Yard
-------------------------	---	---------	-------------------------	----	-------------

Area Cost Factor	An AF of 1.05 is used for Oregon, except that an AF of 1.00 (national unmodified average) is used for MII assembly costs and local vendor quotes.	TN	Tons
------------------	---	----	------

Subcontractor Overhead and Profit It is assumed that home office OH is 8% and profit is 9% for the Prime Contractor. Professional labor overhead is 100%. Allowances and items with mandated costs such as per diem do not have overhead and profit applied.

Prime Contractor Overhead and Profit

Items previously developed by Anchor QEA (2010) already include contractor markups, therefore overhead and profit were not applied to those items.

It is assumed that OH is 1% and profit is 0% for vendor quotes for treatment and disposal at offsite disposal facilities. It is assumed that OH is 5% and profit is 0% for quotes for all other material vendor quotes.

Notes: \_\_\_\_\_ Abbreviations: \_\_\_\_\_

HTRW productivity factor is from Exhibit B-3 or B-4 of "A Guide to Developing and Documenting Cost Estimates During the Feasibility Study", EPA 2000		QTY	Quantity	ACR	Acre
The Cost Database Code is a reference code for linking with line item cost information with the cost source database and is not otherwise used within these cost worksheets.		EQUIP	Equipment	BCY	Bank Cubic Yard
		MATL	Material	CLF	100 Linear Foot
		HPF	HTRW Productivity Factor	DY	Days
NA Not Applicable - costs are from previous work or vendor quote		ADJ LABOR	Adjusted Labor for HFP	EA	Each
For citation references, the following sources apply:		ADJ EQUIP	Adjusted Equipment for HFP	LF	Linear Foot
MI (MI Assemblies), GSA (www.gsa.gov), FLC (www.flcdatcenter.com), A (Allowance), V (Vendor Quote), CW (Means CostWorks 2015), P (Previous Work), and FRTR (www.frtr.gov)		UNMOD UC	Unmodified Unit Cost	HR	Hours
		UNMOD LIC	Unmodified Line Item Cost	LB	Pounds
		UNBUR LIC	Unburdened Line Item Cost	LCY	Loose Cubic Yard
		PC OH	Prime Contractor Overhead	LS	Lump Sum
		PC PF	Prime Contractor Profit	RL	Roll
		BUR LIC	Burdened Line Item Cost	SY	Square Yard

<b><u>Source of Cost Data:</u></b>		<b><u>NOTES:</u></b>
NA Not Applicable - costs are from previous work or vendor quote		Field work will be in Level "D" PPE.
For citation references, the following sources apply:		MI assembly costs include HFP adjustments.
MI (MI Assemblies), GSA (www.gsa.gov), FLC (www.flcdatcenter.com), A (Allowance), V (Vendor Quote), CW (Means CostWorks 2015), P (Previous Work), and FRTR (www.frtr.gov)		2015 cost sources are not escalated (EF=1.00). All other costs are escalated based on the USACE CWCCIS, EM 1110-2-1304, Mar 2015.
<b><u>Cost Adjustment Checklist:</u></b>		
FACTOR:		
H&S Productivity (labor and equipment only)		
Escalation to Base Year		

TABLE CW-B8

<b>Alternative B                      Cost Worksheet:      CW-B8</b>															COST WORKSHEET		
<b>Capital Cost Sub-Element</b> <b>Dredging of Contaminated Sediments (Open Water)</b>																	
<b>Site:</b> Portland Harbor Superfund Site <b>Location:</b> Portland, Oregon <b>Phase:</b> Draft Feasibility Study <b>Base Year:</b> 2015															<b>Prepared By:</b> JN  <b>Checked By:</b> AS		<b>Date:</b> 7/27/2015  <b>Date:</b> 7/28/2015
<b>Work Statement:</b> This sub-element involves mechanical dredging of contaminated sediments in open water areas and transport to offloading area. It includes costs for on-site labor, equipment, and materials developed from previous work.																	
<b>Cost Analysis:</b> Cost for Open Water Dredging (Lump Sum)																	
COST DATABASE CODE	DESCRIPTION	QTY	UNIT(S)	HPF	LABOR	ADJ LABOR	EQUIP	ADJ EQUIP	MATL	OTHER	UNMOD UC	UNMOD LIC	PC OH	PC PF	BUR LIC	COST SOURCE CITATION	COMMENTS
P15	Open Water Dredging and Transport	571,534	CY	1.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$38.03	\$38.03	\$21,732,580.35	0%	0%	\$21,732,580	P Previous Work	Developed by Anchor QEA (2010)
												<b>TOTAL UNIT COST:</b>		\$21,732,580			
<div style="display: flex; justify-content: space-between;"> <div style="width: 60%;"> <b>Notes:</b>            HTRW productivity factor is from Exhibit B-3 or B-4 of "A Guide to Developing and Documenting Cost Estimates During the Feasibility Study", EPA 2000            The Cost Database Code is a reference code for linking with line item cost information with the cost source database and is not otherwise used within these cost worksheets.         </div> <div style="width: 35%;"> <b>Abbreviations:</b>            QTY      Quantity            EQUIP    Equipment            MATL     Material            HPF      HTRW Productivity Factor            ADJ LABOR    Adjusted Labor for HFP            ADJ EQUIP    Adjusted Equipment for HFP            UNMOD UC    Unmodified Unit Cost            UNMOD LIC    Unmodified Line Item Cost            UNBUR LIC    Unburdened Line Item Cost            PC OH        Prime Contractor Overhead            PC PF        Prime Contractor Profit            BUR LIC      Burdened Line Item Cost         </div> <div style="width: 5%;">           ACR    Acres            BCY    Bank Cubic Yard            CLF    100 Linear Foot            DY     Days            EA     Each            LF     Linear Foot            HR     Hours            LB     Pounds            LCY    Loose Cubic Yard            LS     Lump Sum            RL     Roll            SY     Square Yard            TN     Tons         </div> </div>																	
<b>Source of Cost Data:</b> NA    Not Applicable - costs are from previous work or vendor quote For citation references, the following sources apply: MII (MII Assemblies), GSA (www.gsa.gov), FLC (www.flcdatabase.com), A (Allowance), V (Vendor Quote), CW (Means CostWorks 2015), P (Previous Work), and FRTR (www.frtr.gov)																	
<b>Cost Adjustment Checklist:</b>																	
<b>NOTES:</b> FACTOR: Field work will be in Level "D" PPE. H&S Productivity (labor and equipment only) MII assembly costs include HPF adjustments. Escalation to Base Year 2015 cost sources are not escalated (EF=1.00). All other costs are escalated based on the USACE CWCCIS, EM 1110-2-1304, Mar 2015. Area Cost Factor An AF of 1.05 is used for Oregon, except that an AF of 1.00 (national unmodified average) is used for MII assembly costs and local vendor quotes. Subcontractor Overhead and Profit It is assumed that home office OH is 8% and profit is 9% for the Prime Contractor. Professional labor overhead is 100%. Allowances and items with mandated costs such as per diem do not have overhead and profit applied. Prime Contractor Overhead and Profit Items previously developed by Anchor QEA (2010) already include contractor markups, therefore overhead and profit were not applied to those items. It is assumed that OH is 1% and profit is 0% for vendor quotes for treatment and disposal at offsite disposal facilities. It is assumed that OH is 5% and profit is 0% for quotes for all other material vendor quotes.																	

TABLE CW-B9

<div style="display: flex; justify-content: space-between;"> <span><b>Alternative B</b></span> <span><b>Cost Worksheet: CW-B9</b></span> </div> <div style="display: flex; justify-content: space-between; margin-top: 5px;"> <span><b>Capital Cost Sub-Element</b></span> <span><b>COST WORKSHEET</b></span> </div> <div style="display: flex; justify-content: space-between; margin-top: 5px;"> <span><b>Dredging of Contaminated Sediments (Confined)</b></span> </div>																	
<b>Site:</b> Portland Harbor Superfund Site <b>Location:</b> Portland, Oregon <b>Phase:</b> Draft Feasibility Study <b>Base Year:</b> 2015												<b>Prepared By:</b> JN  <b>Checked By:</b> AS		<b>Date:</b> 7/27/2015  <b>Date:</b> 7/28/2015			
<b>Work Statement:</b> This sub-element involves mechanical dredging of contaminated sediments in confined areas and transport to offloading area. It includes costs for on-site labor, equipment, and materials developed from previous work.																	
<b>Cost Analysis:</b> Cost for Confined Dredging (Lump Sum)																	
COST DATABASE CODE	DESCRIPTION	QTY	UNIT(S)	HPF	LABOR	ADJ LABOR	EQUIP	ADJ EQUIP	MATL	OTHER	UNMOD UC	UNMOD LIC	PC OH	PC PF	BUR LIC	COST SOURCE CITATION	COMMENTS
P16	Confined Dredging and Transport	144,946	CY	1.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$53.66	\$53.66	\$7,778,164.73	0%	0%	\$7,778,165	P Previous Work	Developed by Anchor QEA (2010)
												<b>TOTAL UNIT COST:</b>		\$7,778,165			
<div style="display: flex; justify-content: space-between;"> <div style="width: 60%;"> <b>Notes:</b>            HTRW productivity factor is from Exhibit B-3 or B-4 of "A Guide to Developing and Documenting Cost Estimates During the Feasibility Study", EPA 2000            The Cost Database Code is a reference code for linking with line item cost information with the cost source database and is not otherwise used within these cost worksheets.         </div> <div style="width: 35%;"> <b>Abbreviations:</b>            QTY Quantity            EQUIP Equipment            MATL Material            HPF HTRW Productivity Factor            ADJ LABOR Adjusted Labor for HFP            ADJ EQUIP Adjusted Equipment for HFP            UNMOD UC Unmodified Unit Cost            UNMOD LIC Unmodified Line Item Cost            UNBUR LIC Unburdened Line Item Cost            PC OH Prime Contractor Overhead            PC PF Prime Contractor Profit            BUR LIC Burdened Line Item Cost         </div> <div style="width: 5%;">           ACR Acres            BCY Bank Cubic Yard            CLF 100 Linear Foot            DY Days            EA Each            LF Linear Foot            HR Hours            LB Pounds            LCY Loose Cubic Yard            LS Lump Sum            RL Roll            SY Square Yard            TN Tons         </div> </div>																	
<b>Source of Cost Data:</b> NA Not Applicable - costs are from previous work or vendor quote For citation references, the following sources apply: MII (MII Assemblies), GSA (www.gsa.gov), FLC (www.flcdatabase.com), A (Allowance), V (Vendor Quote), CW (Means CostWorks 2015), P (Previous Work), and FRTR (www.frtr.gov)																	
<b>Cost Adjustment Checklist:</b> FACTOR: Field work will be in Level "D" PPE. H&S Productivity (labor and equipment only) MII assembly costs include HPF adjustments. Escalation to Base Year 2015 cost sources are not escalated (EF=1.00). All other costs are escalated based on the USACE CWCCIS, EM 1110-2-1304, Mar 2015. Area Cost Factor An AF of 1.05 is used for Oregon, except that an AF of 1.00 (national unmodified average) is used for MII assembly costs and local vendor quotes. Subcontractor Overhead and Profit It is assumed that home office OH is 8% and profit is 9% for the Prime Contractor. Professional labor overhead is 100%. Allowances and items with mandated costs such as per diem do not have overhead and profit applied. Prime Contractor Overhead and Profit Items previously developed by Anchor QEA (2010) already include contractor markups, therefore overhead and profit were not applied to those items. It is assumed that OH is 1% and profit is 0% for vendor quotes for treatment and disposal at offsite disposal facilities. It is assumed that OH is 5% and profit is 0% for quotes for all other material vendor quotes.																	



TABLE CW-B10

<div style="display: flex; justify-content: space-between;"> <span><b>Alternative B</b></span> <span><b>Cost Worksheet: CW-B10</b></span> </div>																	
<b>Capital Cost Sub-Element</b> <b>Excavation of Contaminated Sediments (From Shore for Riverbanks)</b>												<b>COST WORKSHEET</b>					
<b>Site:</b> Portland Harbor Superfund Site <b>Location:</b> Portland, Oregon <b>Phase:</b> Draft Feasibility Study <b>Base Year:</b> 2015												<b>Prepared By:</b> JN  <b>Checked By:</b> AS		<b>Date:</b> 7/27/2015  <b>Date:</b> 7/28/2015			
<b>Work Statement:</b> This sub-element involves mechanical excavation from the shore of contaminated materials along the riverbanks. It includes costs for on-site labor, equipment, and materials developed from previous work.																	
<b>Cost Analysis:</b> Cost for Excavation from Shore for Riverbanks (Lump Sum)																	
COST DATABASE CODE	DESCRIPTION	QTY	UNIT(S)	HPF	LABOR	ADJ LABOR	EQUIP	ADJ EQUIP	MATL	OTHER	UNMOD UC	UNMOD LIC	PC OH	PC PF	BUR LIC	COST SOURCE CITATION	COMMENTS
P17	Dredging from Shore	52,758	CY	1.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$46.80	\$46.80	\$2,469,074.40	0%	0%	\$2,469,074	P Previous Work	Developed by Anchor QEA (2010)
												<b>TOTAL UNIT COST:</b>		\$2,469,074			
<div style="display: flex; justify-content: space-between;"> <div style="width: 60%;"> <b>Notes:</b>            HTRW productivity factor is from Exhibit B-3 or B-4 of "A Guide to Developing and Documenting Cost Estimates During the Feasibility Study", EPA 2000            The Cost Database Code is a reference code for linking with line item cost information with the cost source database and is not otherwise used within these cost worksheets.         </div> <div style="width: 35%;"> <b>Abbreviations:</b>            QTY Quantity            EQUIP Equipment            MATL Material            HPF HTRW Productivity Factor            ADJ LABOR Adjusted Labor for HFP            ADJ EQUIP Adjusted Equipment for HFP            UNMOD UC Unmodified Unit Cost            UNMOD LIC Unmodified Line Item Cost            UNBUR LIC Unburdened Line Item Cost            PC OH Prime Contractor Overhead            PC PF Prime Contractor Profit            BUR LIC Burdened Line Item Cost         </div> <div style="width: 5%;">           ACR Acres            BCY Bank Cubic Yard            CLF 100 Linear Foot            DY Days            EA Each            LF Linear Foot            HR Hours            LB Pounds            LCY Loose Cubic Yard            LS Lump Sum            RL Roll            SY Square Yard            TN Tons         </div> </div>																	
<b>Source of Cost Data:</b> NA Not Applicable - costs are from previous work or vendor quote For citation references, the following sources apply: MII (MII Assemblies), GSA (www.gsa.gov), FLC (www.flcdatcenter.com), A (Allowance), V (Vendor Quote), CW (Means CostWorks 2015), P (Previous Work), and FRTR (www.frtr.gov)																	
<div style="display: flex; justify-content: space-between;"> <div style="width: 45%;"> <b>Cost Adjustment Checklist:</b>            FACTOR:            H&amp;S Productivity (labor and equipment only)            Escalation to Base Year            Area Cost Factor            Subcontractor Overhead and Profit            Prime Contractor Overhead and Profit         </div> <div style="width: 50%;"> <b>NOTES:</b>            Field work will be in Level "D" PPE.            MII assembly costs include HPF adjustments.            2015 cost sources are not escalated (EF=1.00). All other costs are escalated based on the USACE CWCCIS, EM 1110-2-1304, Mar 2015.            An AF of 1.05 is used for Oregon, except that an AF of 1.00 (national unmodified average) is used for MII assembly costs and local vendor quotes.            It is assumed that home office OH is 8% and profit is 9% for the Prime Contractor. Professional labor overhead is 100%. Allowances and items with mandated costs such as per diem do not have overhead and profit applied.            Items previously developed by Anchor QEA (2010) already include contractor markups, therefore overhead and profit were not applied to those items.            It is assumed that OH is 1% and profit is 0% for vendor quotes for treatment and disposal at offsite disposal facilities. It is assumed that OH is 5% and profit is 0% for quotes for all other material vendor quotes.         </div> </div>																	

TABLE CW-B11

<div style="display: flex; justify-content: space-between;"> <span><b>Alternative B</b></span> <span><b>Cost Worksheet: CW-B11</b></span> </div> <div style="display: flex; justify-content: space-between; margin-top: 5px;"> <span><b>Capital Cost Sub-Element</b></span> <span><b>COST WORKSHEET</b></span> </div> <div style="display: flex; justify-content: space-between; margin-top: 5px;"> <span><b>Hydraulic Offloading of the Contaminated Sediments</b></span> </div>																		
<b>Site:</b> Portland Harbor Superfund Site <b>Location:</b> Portland, Oregon <b>Phase:</b> Draft Feasibility Study <b>Base Year:</b> 2015												<b>Prepared By:</b> JN  <b>Checked By:</b> AS		<b>Date:</b> 7/27/2015  <b>Date:</b> 7/28/2015				
<b>Work Statement:</b> This sub-element involves the hydraulic offloading of contaminated sediments. The contaminated sediments would be offloaded at the transload facility (for Subtitle C or Subtitle D disposal). It includes costs for on-site labor, equipment, and materials developed from previous work.																		
<b>Cost Analysis:</b> Cost for Hydraulic Offloading (Lump Sum)																		
COST DATABASE CODE	DESCRIPTION	QTY	UNIT(S)	HPF	LABOR	ADJ LABOR	EQUIP	ADJ EQUIP	MATL	OTHER	UNMOD UC	UNMOD LIC	PC OH	PC PF	BUR LIC	COST SOURCE CITATION	COMMENTS	
	Hydraulic Offloading for Subtitle C Disposal																	
P19	Hydraulic Offloading	290,921	CY	1.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$6.30	\$6.30	\$1,832,802.30	0%	0%	\$1,832,802	P Previous Work	Developed by Anchor QEA (2010)	
	Hydraulic Offloading for Subtitle D Disposal																	
P19	Hydraulic Offloading	478,317	CY	1.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$6.30	\$6.30	\$3,013,397.10	0%	0%	\$3,013,397	P Previous Work	Developed by Anchor QEA (2010)	
															<b>TOTAL UNIT COST:</b>		\$4,846,199	
<div style="display: flex; justify-content: space-between;"> <div style="width: 60%;"> <b>Notes:</b>            HTRW productivity factor is from Exhibit B-3 or B-4 of "A Guide to Developing and Documenting Cost Estimates During the Feasibility Study", EPA 2000            The Cost Database Code is a reference code for linking with line item cost information with the cost source database and is not otherwise used within these cost worksheets.   <b>Source of Cost Data:</b>            NA Not Applicable - costs are from previous work or vendor quote            For citation references, the following sources apply:            MII (MII Assemblies), GSA (www.gsa.gov), FLC (www.flcdatacenter.com), A (Allowance), V (Vendor Quote), CW (Means CostWorks 2015), P (Previous Work), and FRTR (www.frtr.gov)         </div> <div style="width: 35%;"> <b>Abbreviations:</b>            QTY Quantity            EQUIP Equipment            MATL Material            HPF HTRW Productivity Factor            ADJ LABOR Adjusted Labor for HFP            ADJ EQUIP Adjusted Equipment for HFP            UNMOD UC Unmodified Unit Cost            UNMOD LIC Unmodified Line Item Cost            UNBUR LIC Unburdened Line Item Cost            PC OH Prime Contractor Overhead            PC PF Prime Contractor Profit            BUR LIC Burdened Line Item Cost             ACR Acres            BCY Bank Cubic Yard            CLF 100 Linear Foot            DY Days            EA Each            LF Linear Foot            HR Hours            LB Pounds            LCY Loose Cubic Yard            LS Lump Sum            RL Roll            SY Square Yard            TN Tons         </div> </div>																		
<b>Cost Adjustment Checklist:</b> FACTOR: Field work will be in Level "D" PPE. H&S Productivity (labor and equipment only) MII assembly costs include HPF adjustments. Escalation to Base Year 2015 cost sources are not escalated (EF=1.00). All other costs are escalated based on the USACE CWCCIS, EM 1110-2-1304, Mar 2015. Area Cost Factor An AF of 1.05 is used for Oregon, except that an AF of 1.00 (national unmodified average) is used for MII assembly costs and local vendor quotes. Subcontractor Overhead and Profit It is assumed that home office OH is 8% and profit is 9% for the Prime Contractor. Professional labor overhead is 100%. Allowances and items with mandated costs such as per diem do not have overhead and profit applied. Prime Contractor Overhead and Profit Items previously developed by Anchor QEA (2010) already include contractor markups, therefore overhead and profit were not applied to those items. It is assumed that OH is 1% and profit is 0% for vendor quotes for treatment and disposal at offsite disposal facilities. It is assumed that OH is 5% and profit is 0% for quotes for all other material vendor quotes.																		

TABLE CW-B12

<div style="display: flex; justify-content: space-between;"> <div> <b>Alternative B</b>  <b>Capital Cost Sub-Element</b>  <b>Subtitle C/TSCA Disposal (Handling, Transportation, Treatment of Select PTW Materials, and Disposal)</b> </div> <div> <b>Cost Worksheet: CW-B12</b> </div> <div> <b>COST WORKSHEET</b> </div> </div>																																																																					
<b>Site:</b> Portland Harbor Superfund Site <b>Location:</b> Portland, Oregon <b>Phase:</b> Draft Feasibility Study <b>Base Year:</b> 2015												<b>Prepared By:</b> AB  <b>Checked By:</b> JN			<b>Date:</b> 8/11/2015  <b>Date:</b> 8/12/2015																																																						
<b>Work Statement:</b> This sub-element involves the disposal of contaminated sediments at a Subtitle C/TSCA landfill, including materials handling from the barge to truck, transportation of the sediments to the Subtitle C/TSCA landfill, and disposal of contaminated sediments (including treatment for a portion of the PTW volume that is NRC/NAPL). It includes costs for on-site labor, equipment, and materials developed from previous work, as well as recent vendor quotes.																																																																					
<b>Cost Analysis:</b> Cost for Subtitle C/TSCA Disposal (Lump Sum)																																																																					
COST DATABASE CODE	DESCRIPTION	QTY	UNIT(S)	HPF	LABOR	ADJ LABOR	EQUIP	ADJ EQUIP	MATL	OTHER	UNMOD UC	UNMOD LIC	PC OH	PC PF	BUR LIC	COST SOURCE CITATION	COMMENTS																																																				
	<b>Materials Handling</b>																																																																				
P20	Materials Handling from Barge to Upland Stockpile	290,921	CY	1.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$10.46	\$10.46	\$3,043,760.96	0%	0%	\$3,043,761	P Previous Work	Developed by Anchor QEA (2010)																																																				
P21	Mix DE with Dredged Material to Improve Handling	67,640	TON	1.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$2.25	\$2.25	\$152,190.00	0%	0%	\$152,190	P Previous Work	Developed by Anchor QEA (2010)																																																				
M7	Diatomaceous Earth	67,640	TON	1.00	\$0.00	\$0.00	\$0.00	\$0.00	\$105.75	\$0.00	\$105.75	\$7,152,930.00	0%	0%	\$7,152,930	P Previous Work	Vendor Quote - Waste Management, 2010. Assumes 15% mixing rate.																																																				
P22	Materials Handling from Stockpile to Truck/Rail Car	290,921	CY	1.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$8.72	\$8.72	\$2,536,467.47	0%	0%	\$2,536,467	P Previous Work	Developed by Anchor QEA (2010)																																																				
	<b>Transportation and Disposal at Subtitle C/TSCA Landfill</b>																																																																				
M8	Transportation to Subtitle C/TSCA Landfill	290,921	CY	1.00	\$0.00	\$0.00	\$0.00	\$0.00	\$69.75	\$0.00	\$69.75	\$20,291,739.75	8%	9%	\$23,887,436	V Vendor Quote	Assumes truck transportation. Quote - CWM of the Northwest.																																																				
M20	Thermal Desorption Treatment at Subtitle C/TSCA Landfill (Low End of Treatment Cost Range)	145,461	CY	1.00	\$0.00	\$0.00	\$0.00	\$0.00	\$489.00	\$0.00	\$489.00	\$71,130,429.00	1%	0%	\$71,841,733	V Vendor Quote	Quote - CWM of the Northwest																																																				
M9	Thermal Desorption Treatment at Subtitle C/TSCA Landfill (High End of Treatment Cost Range)	145,460	CY	1.00	\$0.00	\$0.00	\$0.00	\$0.00	\$875.75	\$0.00	\$875.75	\$127,386,595.00	1%	0%	\$128,660,461	V Vendor Quote	Quote - CWM of the Northwest.																																																				
M10	Tipping Fee at Subtitle C/TSCA Landfill	290,921	CY	1.00	\$0.00	\$0.00	\$0.00	\$0.00	\$131.75	\$0.00	\$131.75	\$38,328,841.75	1%	0%	\$38,712,130	V Vendor Quote	Quote - CWM of the Northwest.																																																				
<b>TOTAL UNIT COST:</b>														\$275,987,108																																																							
<div style="display: flex; justify-content: space-between;"> <div> <b>Notes:</b>            HTRW productivity factor is from Exhibit B-3 or B-4 of "A Guide to Developing and Documenting Cost Estimates During the Feasibility Study", EPA 2000            The Cost Database Code is a reference code for linking with line item cost information with the cost source database and is not otherwise used within these cost worksheets.         </div> <div> <b>Abbreviations:</b>  <table style="width: 100%; font-size: small;"> <tr> <td>QTY</td><td>Quantity</td><td>ACR</td><td>Acres</td></tr> <tr> <td>EQUIP</td><td>Equipment</td><td>BCY</td><td>Bank Cubic Yard</td></tr> <tr> <td>MATL</td><td>Material</td><td>CLF</td><td>100 Linear Foot</td></tr> <tr> <td>HPF</td><td>HTRW Productivity Factor</td><td>DY</td><td>Days</td></tr> <tr> <td>ADJ LABOR</td><td>Adjusted Labor for HPF</td><td>EA</td><td>Each</td></tr> <tr> <td>ADJ EQUIP</td><td>Adjusted Equipment for HPF</td><td>LF</td><td>Linear Foot</td></tr> <tr> <td>UNMOD UC</td><td>Unmodified Unit Cost</td><td>HR</td><td>Hours</td></tr> <tr> <td>UNMOD LIC</td><td>Unmodified Line Item Cost</td><td>LB</td><td>Pounds</td></tr> <tr> <td>UNBUR LIC</td><td>Unburdened Line Item Cost</td><td>LCY</td><td>Loose Cubic Yard</td></tr> <tr> <td>PC OH</td><td>Prime Contractor Overhead</td><td>LS</td><td>Lump Sum</td></tr> <tr> <td>PC PF</td><td>Prime Contractor Profit</td><td>RL</td><td>Roll</td></tr> <tr> <td>BUR LIC</td><td>Burdened Line Item Cost</td><td>SY</td><td>Square Yard</td></tr> <tr> <td></td><td></td><td>TN</td><td>Tons</td></tr> </table> </div> </div>																		QTY	Quantity	ACR	Acres	EQUIP	Equipment	BCY	Bank Cubic Yard	MATL	Material	CLF	100 Linear Foot	HPF	HTRW Productivity Factor	DY	Days	ADJ LABOR	Adjusted Labor for HPF	EA	Each	ADJ EQUIP	Adjusted Equipment for HPF	LF	Linear Foot	UNMOD UC	Unmodified Unit Cost	HR	Hours	UNMOD LIC	Unmodified Line Item Cost	LB	Pounds	UNBUR LIC	Unburdened Line Item Cost	LCY	Loose Cubic Yard	PC OH	Prime Contractor Overhead	LS	Lump Sum	PC PF	Prime Contractor Profit	RL	Roll	BUR LIC	Burdened Line Item Cost	SY	Square Yard			TN	Tons
QTY	Quantity	ACR	Acres																																																																		
EQUIP	Equipment	BCY	Bank Cubic Yard																																																																		
MATL	Material	CLF	100 Linear Foot																																																																		
HPF	HTRW Productivity Factor	DY	Days																																																																		
ADJ LABOR	Adjusted Labor for HPF	EA	Each																																																																		
ADJ EQUIP	Adjusted Equipment for HPF	LF	Linear Foot																																																																		
UNMOD UC	Unmodified Unit Cost	HR	Hours																																																																		
UNMOD LIC	Unmodified Line Item Cost	LB	Pounds																																																																		
UNBUR LIC	Unburdened Line Item Cost	LCY	Loose Cubic Yard																																																																		
PC OH	Prime Contractor Overhead	LS	Lump Sum																																																																		
PC PF	Prime Contractor Profit	RL	Roll																																																																		
BUR LIC	Burdened Line Item Cost	SY	Square Yard																																																																		
		TN	Tons																																																																		
<div style="display: flex; justify-content: space-between;"> <div> <b>Source of Cost Data:</b>            NA Not Applicable - costs are from previous work or vendor quote            For citation references, the following sources apply:            MII (MII Assemblies), GSA (www.gsa.gov), FLC (www.flcdatabase.com), A (Allowance), V (Vendor Quote), CW (Means CostWorks 2015), P (Previous Work), and FRTR (www.frtr.gov)         </div> </div>																																																																					
<div style="display: flex; justify-content: space-between;"> <div> <b>Cost Adjustment Checklist:</b>            FACTOR:            H&amp;S Productivity (labor and equipment only)            Escalation to Base Year            Area Cost Factor            Subcontractor Overhead and Profit            Prime Contractor Overhead and Profit         </div> <div> <b>NOTES:</b>            Field work will be in Level "D" PPE.            MII assembly costs include HPF adjustments.            2015 cost sources are not escalated (EF=1.00). All other costs are escalated based on the USACE CWCCIS, EM 1110-2-1304, Mar 2015.            An AF of 1.05 is used for Oregon, except that an AF of 1.00 (national unmodified average) is used for MII assembly costs and local vendor quotes.            It is assumed that home office OH is 8% and profit is 9% for the Prime Contractor. Professional labor overhead is 100%. Allowances and items with mandated costs such as per diem do not have overhead and profit applied.            Items previously developed by Anchor QEA (2010) already include contractor markups, therefore overhead and profit were not applied to those items.            It is assumed that OH is 1% and profit is 0% for vendor quotes for treatment and disposal at offsite disposal facilities. It is assumed that OH is 5% and profit is 0% for quotes for all other material vendor quotes.         </div> </div>																																																																					

TABLE CW-B13

Alternative B Cost Worksheet: CW-B13

## Capital Cost Sub-Element

## Subtitle D Disposal (Handling, Transportation, and Disposal)

## COST WORKSHEET

Site: Portland Harbor Superfund Site  
 Location: Portland, Oregon  
 Phase: Draft Feasibility Study  
 Base Year: 2015

Prepared By: AB Date: 8/11/2015

Checked By: JN Date: 8/12/2015

## Work Statement:

This sub-element involves the disposal of contaminated sediments at a Subtitle D landfill, including materials handling from the barge to truck, transportation of the sediments to the Subtitle D landfill, and disposal of contaminated sediments. It includes costs for on-site labor, equipment, and materials developed from previous work, as well as recent vendor quotes.

## Cost Analysis:

Cost for Subtitle D Disposal (Lump Sum)

COST DATABASE CODE	DESCRIPTION	QTY	UNIT(S)	HPF	LABOR	ADJ LABOR	EQUIP	ADJ EQUIP	MATL	OTHER	UNMOD UC	UNMOD LIC	PC OH	PC PF	BUR LIC	COST SOURCE CITATION	COMMENTS
	Materials Handling																
P20	Materials Handling from Barge to Upland Stockpile	478,317	CY	1.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$10.46	\$10.46	\$5,004,391.61	0%	0%	\$5,004,392	P Previous Work	Developed by Anchor QEA (2010)
P21	Mix DE with Dredged Material to Improve Handling	37,070	TON	1.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$2.25	\$2.25	\$83,407.50	0%	0%	\$83,408	P Previous Work	Developed by Anchor QEA (2010)
M7	Diatomaceous Earth	37,070	TON	1.00	\$0.00	\$0.00	\$0.00	\$0.00	\$105.75	\$0.00	\$105.75	\$3,920,152.50	0%	0%	\$3,920,153	P Previous Work	Vendor Quote - Waste Management, 2010. Assumes 5% mixing rate.
P22	Materials Handling from Stockpile to Truck/Rail Car	478,317	CY	1.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$8.72	\$8.72	\$4,170,326.34	0%	0%	\$4,170,326	P Previous Work	Developed by Anchor QEA (2010)
P37	Gondola/Rail Car Mobilization	2,000	EA	1.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$4,500.00	\$4,500.00	\$9,000,000.00	0%	0%	\$9,000,000	P Previous Work	Developed by Anchor QEA (2010)
	Transportation and Disposal at Subtitle D Landfill																
M11	Transportation and Disposal at Subtitle D Landfill	478,317	CY	1.00	\$0.00	\$0.00	\$0.00	\$0.00	\$90.68	\$0.00	\$90.68	\$43,373,785.56	1%	0%	\$43,807,523	P Previous Work	Quote - Republic Services (Roosevelt Landfill). Assumes rail transportation to disposal facility.
TOTAL UNIT COST:															\$65,985,802		

## Notes:

HTRW productivity factor is from Exhibit B-3 or B-4 of "A Guide to Developing and Documenting Cost Estimates During the Feasibility Study", EPA 2000  
 The Cost Database Code is a reference code for linking with line item cost information with the cost source database and is not otherwise used within these cost worksheets.

## Source of Cost Data:

NA Not Applicable - costs are from previous work or vendor quote

For citation references, the following sources apply:

MII (MII Assemblies), GSA (www.gsa.gov), FLC (www.flcdatacenter.com), A (Allowance), V (Vendor Quote), CW (Means CostWorks 2015), P (Previous Work), and FRTR (www.frtr.gov)

## Cost Adjustment Checklist:

## FACTOR:

H&amp;S Productivity (labor and equipment only)

Escalation to Base Year

Area Cost Factor

Subcontractor Overhead and Profit

Prime Contractor Overhead and Profit

## NOTES:

Field work will be in Level "D" PPE.

MII assembly costs include HPF adjustments.

2015 cost sources are not escalated (EF=1.00). All other costs are escalated based on the USACE CWCCIS, EM 1110-2-1304, Mar 2015.

An AF of 1.05 is used for Oregon, except that an AF of 1.00 (national unmodified average) is used for MII assembly costs and local vendor quotes.

It is assumed that home office OH is 8% and profit is 9% for the Prime Contractor. Professional labor overhead is 100%. Allowances and items with mandated costs such as per diem do not have overhead and profit applied.

Items previously developed by Anchor QEA (2010) already include contractor markups, therefore overhead and profit were not applied to those items.

It is assumed that OH is 1% and profit is 0% for vendor quotes for treatment and disposal at offsite disposal facilities. It is assumed that OH is 5% and profit is 0% for quotes for all other material vendor quotes.

## Abbreviations:

QTY	Quantity	ACR	Acres
EQUIP	Equipment	BCY	Bank Cubic Yard
MATL	Material	CLF	100 Linear Foot
HPF	HTRW Productivity Factor	DY	Days
ADJ LABOR	Adjusted Labor for HFP	EA	Each
ADJ EQUIP	Adjusted Equipment for HFP	LF	Linear Foot
UNMOD UC	Unmodified Unit Cost	HR	Hours
UNMOD LIC	Unmodified Line Item Cost	LB	Pounds
UNBUR LIC	Unburdened Line Item Cost	LCY	Loose Cubic Yard
PC OH	Prime Contractor Overhead	LS	Lump Sum
PC PF	Prime Contractor Profit	RL	Roll
BUR LIC	Burdened Line Item Cost	SY	Square Yard
		TN	Tons

TABLE CW-B14

**Alternative B**  
**Capital Cost Sub-Element**  
**Mitigation**

**Cost Worksheet: CW-B14**

**COST WORKSHEET**

**Site:** Portland Harbor Superfund Site **Prepared By:** AB **Date:** 8/11/2015  
**Location:** Portland, Oregon  
**Phase:** Draft Feasibility Study **Checked By:** JN **Date:** 8/12/2015  
**Base Year:** 2015

**Work Statement:**

This sub-element involves mitigation of shallow water and riverbank areas. It includes costs for on-site labor, equipment, and materials developed from previous work.

**Cost Analysis:**

Cost for Mitigation (Lump Sum)

COST DATABASE CODE	DESCRIPTION	QTY	UNIT(S)	HPF	LABOR	ADJ LABOR	EQUIP	ADJ EQUIP	MATL	OTHER	UNMOD UC	UNMOD LIC	PC OH	PC PF	BUR LIC	COST SOURCE CITATION	COMMENTS
P50	Mitigation	13.7	AC	1.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$2,347,130.25	\$2,347,130.25	\$32,155,684.43	0%	0%	\$32,155,684	P Previous Work	Average cost of two Lower Duwamish projects presented and referenced in Table 6.1-1 by Anchor QEA (2010).
												<b>TOTAL UNIT COST:</b>		\$32,155,684			

**Notes:**

HTRW productivity factor is from Exhibit B-3 or B-4 of "A Guide to Developing and Documenting Cost Estimates During the Feasibility Study", EPA 2000

The Cost Database Code is a reference code for linking with line item cost information with the cost source database and is not otherwise used within these cost worksheets.

**Source of Cost Data:**

NA Not Applicable - costs are from previous work or vendor quote

For citation references, the following sources apply:

MII (MII Assemblies), GSA (www.gsa.gov), FLC (www.flcdatcenter.com), A (Allowance), V (Vendor Quote), CW (Means CostWorks 2015), P (Previous Work), and FRTR (www.frtr.gov)

**Cost Adjustment Checklist:**

FACTOR:  
H&S Productivity (labor and equipment only)  
Escalation to Base Year  
Area Cost Factor  
Subcontractor Overhead and Profit  
Prime Contractor Overhead and Profit

**NOTES:**

Field work will be in Level "D" PPE.

MII assembly costs include HPF adjustments.

2015 cost sources are not escalated (EF=1.00). All other costs are escalated based on the USACE CWCCIS, EM 1110-2-1304, Mar 2015.

An AF of 1.05 is used for Oregon, except that an AF of 1.00 (national unmodified average) is used for MII assembly costs and local vendor quotes.

It is assumed that home office OH is 8% and profit is 9% for the Prime Contractor. Professional labor overhead is 100%. Allowances and items with mandated costs such as per diem do not have overhead and profit applied.

Items previously developed by Anchor QEA (2010) already include contractor markups, therefore overhead and profit were not applied to those items.

It is assumed that OH is 1% and profit is 0% for vendor quotes for treatment and disposal at offsite disposal facilities. It is assumed that OH is 5% and profit is 0% for quotes for all other material vendor quotes.

**Abbreviations:**

QTY	Quantity	ACR	Acres
EQUIP	Equipment	BCY	Bank Cubic Yard
MATL	Material	CLF	100 Linear Foot
HPF	HTRW Productivity Factor	DY	Days
ADJ LABOR	Adjusted Labor for HFP	EA	Each
ADJ EQUIP	Adjusted Equipment for HFP	LF	Linear Foot
UNMOD UC	Unmodified Unit Cost	HR	Hours
UNMOD LIC	Unmodified Line Item Cost	LB	Pounds
UNBUR LIC	Unburdened Line Item Cost	LCY	Loose Cubic Yard
PC OH	Prime Contractor Overhead	LS	Lump Sum
PC PF	Prime Contractor Profit	RL	Roll
BUR LIC	Burdened Line Item Cost	SY	Square Yard
		TN	Tons

TABLE CW-B15

Alternative B Cost Worksheet: CW-B15

## Capital Cost Sub-Element

## Sand Placement for Technology Assignments

## COST WORKSHEET

Site: Portland Harbor Superfund Site Prepared By: JN Date: 7/27/2015  
 Location: Portland, Oregon  
 Phase: Draft Feasibility Study Checked By: AS Date: 7/28/2015  
 Base Year: 2015

## Work Statement:

This sub-element involves the placement of sand for the construction of capping areas. It includes placement of sand within confined areas as well as open water areas. It includes costs for on-site labor, equipment, and materials developed from previous work.

## Cost Analysis:

Cost for Sand Placement for Technology Assignments (Lump Sum)

COST DATABASE CODE	DESCRIPTION	QTY	UNIT(S)	HPF	LABOR	ADJ LABOR	EQUIP	ADJ EQUIP	MATL	OTHER	UNMOD UC	UNMOD LIC	PC OH	PC PF	BUR LIC	COST SOURCE CITATION	COMMENTS
	Sand Placement (Riverbanks)																
P2	Sand Placement (Confined)	29,685	LCY	1.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$49.01	\$49.01	\$1,454,713.43	0%	0%	\$1,454,713	P Previous Work	Developed by Anchor QEA (2010)
M1	Sand	29,685	LCY	1.00	\$0.00	\$0.00	\$0.00	\$0.00	\$19.71	\$0.00	\$19.71	\$585,091.35	0%	0%	\$585,091	P Previous Work	Knife River Quote #7838 (2010)
	Sand Placement (Confined)																
P2	Sand Placement (Confined)	38,984	LCY	1.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$49.01	\$49.01	\$1,910,410.92	0%	0%	\$1,910,411	P Previous Work	Developed by Anchor QEA (2010)
M1	Sand	38,984	LCY	1.00	\$0.00	\$0.00	\$0.00	\$0.00	\$19.71	\$0.00	\$19.71	\$768,374.64	0%	0%	\$768,375	P Previous Work	Knife River Quote #7838 (2010)
	Sand Placement (Open Water)																
P6	Sand Placement (Open Water)	208,481	LCY	1.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$23.76	\$23.76	\$4,953,508.56	0%	0%	\$4,953,509	P Previous Work	Developed by Anchor QEA (2010)
M1	Sand	208,481	LCY	1.00	\$0.00	\$0.00	\$0.00	\$0.00	\$19.71	\$0.00	\$19.71	\$4,109,160.51	0%	0%	\$4,109,161	P Previous Work	Knife River Quote #7838 (2010)
TOTAL UNIT COST:															\$13,781,260		

## Notes:

HTRW productivity factor is from Exhibit B-3 or B-4 of "A Guide to Developing and Documenting Cost Estimates During the Feasibility Study", EPA 2000  
 The Cost Database Code is a reference code for linking with line item cost information with the cost source database and is not otherwise used within these cost worksheets.

## Source of Cost Data:

NA Not Applicable - costs are from previous work or vendor quote

For citation references, the following sources apply:

MII (MII Assemblies), GSA (www.gsa.gov), FLC (www.flcdatcenter.com), A (Allowance), V (Vendor Quote), CW (Means CostWorks 2015), P (Previous Work), and FRTR (www.frtr.gov)

## Cost Adjustment Checklist:

FACTOR:  
 H&S Productivity (labor and equipment only)  
 Escalation to Base Year  
 Area Cost Factor  
 Subcontractor Overhead and Profit  
 Prime Contractor Overhead and Profit

## NOTES:

Field work will be in Level "D" PPE.  
 MII assembly costs include HPF adjustments.  
 2015 cost sources are not escalated (EF=1.00). All other costs are escalated based on the USACE CWCCIS, EM 1110-2-1304, Mar 2015.  
 An AF of 1.05 is used for Oregon, except that an AF of 1.00 (national unmodified average) is used for MII assembly costs and local vendor quotes.  
 It is assumed that home office OH is 8% and profit is 9% for the Prime Contractor. Professional labor overhead is 100%. Allowances and items with mandated costs such as per diem do not have overhead and profit applied.  
 Items previously developed by Anchor QEA (2010) already include contractor markups, therefore overhead and profit were not applied to those items.  
 It is assumed that OH is 1% and profit is 0% for vendor quotes for treatment and disposal at offsite disposal facilities. It is assumed that OH is 5% and profit is 0% for quotes for all other material vendor quotes.

## Abbreviations:

QTY	Quantity	ACR	Acres
EQUIP	Equipment	BCY	Bank Cubic Yard
MATL	Material	CLF	100 Linear Foot
HPF	HTRW Productivity Factor	DY	Days
ADJ LABOR	Adjusted Labor for HFP	EA	Each
ADJ EQUIP	Adjusted Equipment for HFP	LF	Linear Foot
UNMOD UC	Unmodified Unit Cost	HR	Hours
UNMOD LIC	Unmodified Line Item Cost	LB	Pounds
UNBUR LIC	Unburdened Line Item Cost	LCY	Loose Cubic Yard
PC OH	Prime Contractor Overhead	LS	Lump Sum
PC PF	Prime Contractor Profit	RL	Roll
BUR LIC	Burdened Line Item Cost	SY	Square Yard
		TN	Tons

TABLE CW-B16

Alternative B Cost Worksheet: CW-B16

## Capital Cost Sub-Element

## Beach Mix Placement for Technology Assignments

## COST WORKSHEET

Site: Portland Harbor Superfund Site

Prepared By: JN

Date: 7/27/2015

Location: Portland, Oregon

Phase: Draft Feasibility Study

Checked By: AS

Date: 7/28/2015

Base Year: 2015

## Work Statement:

This sub-element involves the placement of beach mix for the construction of capping areas. It includes placement of beach mix within confined areas as well as open water areas. It includes costs for on-site labor, equipment, and materials developed from previous work.

## Cost Analysis:

Cost for Beach Mix Placement for Technology Assignments (Lump Sum)

COST DATABASE CODE	DESCRIPTION	QTY	UNIT(S)	HPF	LABOR	ADJ LABOR	EQUIP	ADJ EQUIP	MATL	OTHER	UNMOD UC	UNMOD LIC	PC OH	PC PF	BUR LIC	COST SOURCE CITATION	COMMENTS
	Beach Mix Placement (Riverbanks)																
P5	Beach Mix Placement (Confined)	5,566	LCY	1.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$58.50	\$58.50	\$325,611.00	0%	0%	\$325,611	P Previous Work	Developed by Anchor QEA (2010)
M5	ODOT 100 Beach Mix	5,566	LCY	1.00	\$0.00	\$0.00	\$0.00	\$0.00	\$57.59	\$0.00	\$57.59	\$320,545.94	0%	0%	\$320,546	P Previous Work	Knife River Quote #7838 (2010)
	Beach Mix Placement (Confined)																
P5	Beach Mix Placement (Confined)	1,478	LCY	1.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$58.50	\$58.50	\$86,463.00	0%	0%	\$86,463	P Previous Work	Developed by Anchor QEA (2010)
M5	ODOT 100 Beach Mix	1,478	LCY	1.00	\$0.00	\$0.00	\$0.00	\$0.00	\$57.59	\$0.00	\$57.59	\$85,118.02	0%	0%	\$85,118	P Previous Work	Knife River Quote #7838 (2010)
	Beach Mix Placement (Open Water)																
P39	Beach Mix Placement (Open Water)	7,767	LCY	1.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$28.34	\$28.34	\$220,107.07	0%	0%	\$220,107	P Previous Work	Developed by Anchor QEA (2010)
M5	ODOT 100 Beach Mix	7,767	LCY	1.00	\$0.00	\$0.00	\$0.00	\$0.00	\$57.59	\$0.00	\$57.59	\$447,301.53	0%	0%	\$447,302	P Previous Work	Knife River Quote #7838 (2010)
TOTAL UNIT COST:															\$1,485,147		

## Notes:

HTRW productivity factor is from Exhibit B-3 or B-4 of "A Guide to Developing and Documenting Cost Estimates During the Feasibility Study", EPA 2000

The Cost Database Code is a reference code for linking with line item cost information with the cost source database and is not otherwise used within these cost worksheets.

## Source of Cost Data:

NA Not Applicable - costs are from previous work or vendor quote

For citation references, the following sources apply:

MII (MII Assemblies), GSA (www.gsa.gov), FLC (www.flcdatcenter.com), A (Allowance), V (Vendor Quote), CW (Means CostWorks 2015), P (Previous Work), and FRTR (www.frtr.gov)

## Cost Adjustment Checklist:

FACTOR:

H&S Productivity (labor and equipment only)

Escalation to Base Year

Area Cost Factor

Subcontractor Overhead and Profit

Prime Contractor Overhead and Profit

## NOTES:

Field work will be in Level "D" PPE.

MI assembly costs include HPF adjustments.

2015 cost sources are not escalated (EF=1.00). All other costs are escalated based on the USACE CWCCIS, EM 1110-2-1304, Mar 2015.

An AF of 1.05 is used for Oregon, except that an AF of 1.00 (national unmodified average) is used for MII assembly costs and local vendor quotes.

It is assumed that home office OH is 8% and profit is 9% for the Prime Contractor. Professional labor overhead is 100%. Allowances and items with mandated costs such as per diem do not have overhead and profit applied.

Items previously developed by Anchor QEA (2010) already include contractor markups, therefore overhead and profit were not applied to those items.

It is assumed that OH is 1% and profit is 0% for vendor quotes for treatment and disposal at offsite disposal facilities. It is assumed that OH is 5% and profit is 0% for quotes for all other material vendor quotes.

## Abbreviations:

QTY	Quantity	ACR	Acres
EQUIP	Equipment	BCY	Bank Cubic Yard
MATL	Material	CLF	100 Linear Foot
HPF	HTRW Productivity Factor	DY	Days
ADJ LABOR	Adjusted Labor for HFP	EA	Each
ADJ EQUIP	Adjusted Equipment for HFP	LF	Linear Foot
UNMOD UC	Unmodified Unit Cost	HR	Hours
UNMOD LIC	Unmodified Line Item Cost	LB	Pounds
UNBUR LIC	Unburdened Line Item Cost	LCY	Loose Cubic Yard
PC OH	Prime Contractor Overhead	LS	Lump Sum
PC PF	Prime Contractor Profit	RL	Roll
BUR LIC	Burdened Line Item Cost	SY	Square Yard
		TN	Tons

TABLE CW-B17

Alternative B Cost Worksheet: CW-B17

## Capital Cost Sub-Element

## Armor Placement for Technology Assignments

## COST WORKSHEET

Site: Portland Harbor Superfund Site

Prepared By: JN

Date: 7/27/2015

Location: Portland, Oregon

Phase: Draft Feasibility Study

Checked By: AS

Date: 7/28/2015

Base Year: 2015

## Work Statement:

This sub-element involves the placement of armor for the construction of capping areas. It includes placement of armor with confined areas as well as open water areas. It includes costs for on-site labor, equipment, and materials developed from previous work.

## Cost Analysis:

Cost for Armor Placement for Technology Assignments (Lump Sum)

COST DATABASE CODE	DESCRIPTION	QTY	UNIT(S)	HPF	LABOR	ADJ LABOR	EQUIP	ADJ EQUIP	MATL	OTHER	UNMOD UC	UNMOD LIC	PC OH	PC PF	BUR LIC	COST SOURCE CITATION	COMMENTS
	Armor Placement (Riverbanks)																
P3	ODOT 200 Placement (Confined)	4,517	LCY	1.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$58.50	\$58.50	\$264,244.50	0%	0%	\$264,245	P Previous Work	Developed by Anchor QEA (2010)
M2	ODOT 200 Armor	4,517	LCY	1.00	\$0.00	\$0.00	\$0.00	\$0.00	\$57.59	\$0.00	\$57.59	\$260,134.03	0%	0%	\$260,134	P Previous Work	Knife River Quote #7838 (2010)
	Armor Placement (Confined)																
P3	ODOT 200 Placement (Confined)	8,348	LCY	1.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$58.50	\$58.50	\$488,358.00	0%	0%	\$488,358	P Previous Work	Developed by Anchor QEA (2010)
M2	ODOT 200 Armor	8,348	LCY	1.00	\$0.00	\$0.00	\$0.00	\$0.00	\$57.59	\$0.00	\$57.59	\$480,761.32	0%	0%	\$480,761	P Previous Work	Knife River Quote #7838 (2010)
	Armor Placement (Open Water)																
P7	ODOT 200 Placement (Open Water)	9,122	LCY	1.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$28.34	\$28.34	\$258,506.08	0%	0%	\$258,506	P Previous Work	Developed by Anchor QEA (2010)
M2	ODOT 200 Armor	9,122	LCY	1.00	\$0.00	\$0.00	\$0.00	\$0.00	\$57.59	\$0.00	\$57.59	\$525,335.98	0%	0%	\$525,336	P Previous Work	Knife River Quote #7838 (2010)
TOTAL UNIT COST:															\$2,277,340		

## Notes:

HTRW productivity factor is from Exhibit B-3 or B-4 of "A Guide to Developing and Documenting Cost Estimates During the Feasibility Study", EPA 2000

The Cost Database Code is a reference code for linking with line item cost information with the cost source database and is not otherwise used within these cost worksheets.

## Source of Cost Data:

NA Not Applicable - costs are from previous work or vendor quote

For citation references, the following sources apply:

MII (MII Assemblies), GSA (www.gsa.gov), FLC (www.flcdatcenter.com), A (Allowance), V (Vendor Quote), CW (Means CostWorks 2015), P (Previous Work), and FRTR (www.frtr.gov)

## Cost Adjustment Checklist:

FACTOR:

H&S Productivity (labor and equipment only)

Escalation to Base Year

Area Cost Factor

Subcontractor Overhead and Profit

Prime Contractor Overhead and Profit

## NOTES:

Field work will be in Level "D" PPE.

MI assembly costs include HPF adjustments.

2015 cost sources are not escalated (EF=1.00). All other costs are escalated based on the USACE CWCCIS, EM 1110-2-1304, Mar 2015.

An AF of 1.05 is used for Oregon, except that an AF of 1.00 (national unmodified average) is used for MII assembly costs and local vendor quotes.

It is assumed that home office OH is 8% and profit is 9% for the Prime Contractor. Professional labor overhead is 100%. Allowances and items with mandated costs such as per diem do not have overhead and profit applied.

Items previously developed by Anchor QEA (2010) already include contractor markups, therefore overhead and profit were not applied to those items.

It is assumed that OH is 1% and profit is 0% for vendor quotes for treatment and disposal at offsite disposal facilities. It is assumed that OH is 5% and profit is 0% for quotes for all other material vendor quotes.

## Abbreviations:

QTY	Quantity	ACR	Acres
EQUIP	Equipment	BCY	Bank Cubic Yard
MATL	Material	CLF	100 Linear Foot
HPF	HTRW Productivity Factor	DY	Days
ADJ LABOR	Adjusted Labor for HFP	EA	Each
ADJ EQUIP	Adjusted Equipment for HFP	LF	Linear Foot
UNMOD UC	Unmodified Unit Cost	HR	Hours
UNMOD LIC	Unmodified Line Item Cost	LB	Pounds
UNBUR LIC	Unburdened Line Item Cost	LCY	Loose Cubic Yard
PC OH	Prime Contractor Overhead	LS	Lump Sum
PC PF	Prime Contractor Profit	RL	Roll
BUR LIC	Burdened Line Item Cost	SY	Square Yard
		TN	Tons



TABLE CW-B18

**Alternative B****Cost Worksheet: CW-B18****Capital Cost Sub-Element****Reactive/GAC Placement for Technology Assignments****COST WORKSHEET****Site:** Portland Harbor Superfund Site**Prepared By:** JN**Date:** 7/27/2015**Location:** Portland, Oregon**Phase:** Draft Feasibility Study**Checked By:** AS**Date:** 7/28/2015**Base Year:** 2015**Work Statement:**

This sub-element involves the placement of the reactive layers for the construction of capping areas. It includes placement of armor within confined areas as well as open water areas. It includes costs for on-site labor, equipment, and materials developed from previous work, as well as recent vendor quotes.

**Cost Analysis:**

Cost for Reactive/GAC Placement for Technology Assignments (Lump Sum)

COST DATABASE CODE	DESCRIPTION	QTY	UNIT(S)	HPF	LABOR	ADJ LABOR	EQUIP	ADJ EQUIP	MATL	OTHER	UNMOD UC	UNMOD LIC	PC OH	PC PF	BUR LIC	COST SOURCE CITATION	COMMENTS
	<b>Reactive/GAC Placement (Riverbanks)</b>																
P40	Carbon (AquaGate + PAC 5%) Placement (Confined)	570	TON	1.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$816.75	\$816.75	\$465,547.50	0%	0%	\$465,548	P Previous Work	Adapted from unit cost developed by Anchor QEA (2010). Unit cost is \$/TON as carbon
M4	Carbon (AquaGate + PAC 5%)	570	TON	1.00	\$0.00	\$0.00	\$0.00	\$0.00	\$8,000.00	\$0.00	\$8,000.00	\$4,560,000.00	5%	0%	\$4,788,000	V Vendor Quote	Vendor Quote - AquaBlok 2015. Material cost is \$/TON (as Carbon).
	<b>Reactive/GAC Placement (Confined)</b>																
P40	Carbon (AquaGate + PAC 5%) Placement (Confined)	612	TON	1.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$816.75	\$816.75	\$499,851.00	0%	0%	\$499,851	P Previous Work	Adapted from unit cost developed by Anchor QEA (2010). Unit cost is \$/TON as carbon
M4	Carbon (AquaGate + PAC 5%)	612	TON	1.00	\$0.00	\$0.00	\$0.00	\$0.00	\$8,000.00	\$0.00	\$8,000.00	\$4,896,000.00	5%	0%	\$5,140,800	V Vendor Quote	Vendor Quote - AquaBlok 2015. Material cost is \$/TON (as Carbon).
	<b>Reactive/GAC Placement (Open Water)</b>																
P41	Carbon (AquaGate + PAC 5%) Placement (Open Water)	4,582	TON	1.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$396.00	\$396.00	\$1,814,472.00	0%	0%	\$1,814,472	P Previous Work	Adapted from unit cost developed by Anchor QEA (2010). Unit cost is \$/TON as carbon.
M4	Carbon (AquaGate + PAC 5%)	4,582	TON	1.00	\$0.00	\$0.00	\$0.00	\$0.00	\$8,000.00	\$0.00	\$8,000.00	\$36,656,000.00	5%	0%	\$38,488,800	V Vendor Quote	Vendor Quote - AquaBlok 2015. Material cost is \$/TON (as Carbon).
<b>TOTAL UNIT COST:</b>															\$51,197,471		

**Notes:**

HTRW productivity factor is from Exhibit B-3 or B-4 of "A Guide to Developing and Documenting Cost Estimates During the Feasibility Study", EPA 2000

The Cost Database Code is a reference code for linking with line item cost information with the cost source database and is not otherwise used within these cost worksheets.

**Source of Cost Data:**

NA Not Applicable - costs are from previous work or vendor quote

For citation references, the following sources apply:

MII (MII Assemblies), GSA (www.gsa.gov), FLC (www.flcdatcenter.com), A (Allowance), V (Vendor Quote), CW (Means CostWorks 2015), P (Previous Work), and FRTR (www.frtr.gov)

**Cost Adjustment Checklist:**

FACTOR:

H&S Productivity (labor and equipment only)

Escalation to Base Year

Area Cost Factor

Subcontractor Overhead and Profit

Prime Contractor Overhead and Profit

**NOTES:**

Field work will be in Level "D" PPE.

MII assembly costs include HPF adjustments.

2015 cost sources are not escalated (EF=1.00). All other costs are escalated based on the USACE CWCCIS, EM 1110-2-1304, Mar 2015.

An AF of 1.05 is used for Oregon, except that an AF of 1.00 (national unmodified average) is used for MII assembly costs and local vendor quotes.

It is assumed that home office OH is 8% and profit is 9% for the Prime Contractor. Professional labor overhead is 100%. Allowances and items with mandated costs such as per diem do not have overhead and profit applied.

Items previously developed by Anchor QEA (2010) already include contractor markups, therefore overhead and profit were not applied to those items.

It is assumed that OH is 1% and profit is 0% for vendor quotes for treatment and disposal at offsite disposal facilities. It is assumed that OH is 5% and profit is 0% for quotes for all other material vendor quotes.

**Abbreviations:**

QTY	Quantity	ACR	Acres
EQUIP	Equipment	BCY	Bank Cubic Yard
MATL	Material	CLF	100 Linear Foot
HPF	HTRW Productivity Factor	DY	Days
ADJ LABOR	Adjusted Labor for HFP	EA	Each
ADJ EQUIP	Adjusted Equipment for HFP	LF	Linear Foot
UNMOD UC	Unmodified Unit Cost	HR	Hours
UNMOD LIC	Unmodified Line Item Cost	LB	Pounds
UNBUR LIC	Unburdened Line Item Cost	LCY	Loose Cubic Yard
PC OH	Prime Contractor Overhead	LS	Lump Sum
PC PF	Prime Contractor Profit	RL	Roll
BUR LIC	Burdened Line Item Cost	SY	Square Yard
		TN	Tons

TABLE CW-B19

**Alternative B**  
**Capital Cost Sub-Element**  
**Geofabric for Riverbanks**

**Cost Worksheet: CW-B19**

**COST WORKSHEET**

**Site:** Portland Harbor Superfund Site  
**Location:** Portland, Oregon  
**Phase:** Draft Feasibility Study  
**Base Year:** 2015

**Prepared By:** JN **Date:** 7/27/2015

**Checked By:** AS **Date:** 7/28/2015

**Work Statement:**

This sub-element involves the installation of geofabric along the riverbanks. It includes costs for on-site labor, equipment, and materials developed from previous work.

**Cost Analysis:**

Cost for Geofabric for Riverbanks (Lump Sum)

COST DATABASE CODE	DESCRIPTION	QTY	UNIT(S)	HPF	LABOR	ADJ LABOR	EQUIP	ADJ EQUIP	MATL	OTHER	UNMOD UC	UNMOD LIC	PC OH	PC PF	BUR LIC	COST SOURCE CITATION	COMMENTS
P51	Geotextile Installation	10.7	AC	1.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$7,060.20	\$7,060.20	\$75,544.19	8%	9%	\$88,931	P Previous Work	equipment for installation
M13	Geotextile	10.7	AC	1.00	\$0.00	\$0.00	\$0.00	\$0.00	\$5,687.39	\$0.00	\$5,687.39	\$60,855.07	5%	0%	\$63,898	V Vendor Quote	Vendor Quote (2014)
												<b>TOTAL UNIT COST:</b>		\$152,829			

**Notes:**

HTRW productivity factor is from Exhibit B-3 or B-4 of "A Guide to Developing and Documenting Cost Estimates During the Feasibility Study", EPA 2000

The Cost Database Code is a reference code for linking with line item cost information with the cost source database and is not otherwise used within these cost worksheets.

**Source of Cost Data:**

NA Not Applicable - costs are from previous work or vendor quote

For citation references, the following sources apply:

MII (MII Assemblies), GSA (www.gsa.gov), FLC (www.flcdatcenter.com), A (Allowance), V (Vendor Quote), CW (Means CostWorks 2015), P (Previous Work), and FRTR (www.frtr.gov)

**Cost Adjustment Checklist:**

FACTOR:

H&S Productivity (labor and equipment only)

Escalation to Base Year

Area Cost Factor

Subcontractor Overhead and Profit

Prime Contractor Overhead and Profit

**NOTES:**

Field work will be in Level "D" PPE.

MII assembly costs include HPF adjustments.

2015 cost sources are not escalated (EF=1.00). All other costs are escalated based on the USACE CWCCIS, EM 1110-2-1304, Mar 2015.

An AF of 1.05 is used for Oregon, except that an AF of 1.00 (national unmodified average) is used for MII assembly costs and local vendor quotes.

It is assumed that home office OH is 8% and profit is 9% for the Prime Contractor. Professional labor overhead is 100%. Allowances and items with mandated costs such as per diem do not have overhead and profit applied.

Items previously developed by Anchor QEA (2010) already include contractor markups, therefore overhead and profit were not applied to those items.

It is assumed that OH is 1% and profit is 0% for vendor quotes for treatment and disposal at offsite disposal facilities. It is assumed that OH is 5% and profit is 0% for quotes for all other material vendor quotes.

**Abbreviations:**

QTY	Quantity	ACR	Acres
EQUIP	Equipment	BCY	Bank Cubic Yard
MATL	Material	CLF	100 Linear Foot
HPF	HTRW Productivity Factor	DY	Days
ADJ LABOR	Adjusted Labor for HFP	EA	Each
ADJ EQUIP	Adjusted Equipment for HFP	LF	Linear Foot
UNMOD UC	Unmodified Unit Cost	HR	Hours
UNMOD LIC	Unmodified Line Item Cost	LB	Pounds
UNBUR LIC	Unburdened Line Item Cost	LCY	Loose Cubic Yard
PC OH	Prime Contractor Overhead	LS	Lump Sum
PC PF	Prime Contractor Profit	RL	Roll
BUR LIC	Burdened Line Item Cost	SY	Square Yard
		TN	Tons

TABLE CW-B20

Alternative B Cost Worksheet: CW-B20

## Capital Cost Sub-Element

## Organoclay Mat Placement for Technology Assignments

## COST WORKSHEET

Site: Portland Harbor Superfund Site

Prepared By: JN

Date: 7/27/2015

Location: Portland, Oregon

Phase: Draft Feasibility Study

Checked By: AS

Date: 7/28/2015

Base Year: 2015

## Work Statement:

This sub-element involves the placement of the organoclay mat for the construction of capping areas. It includes placement of the organoclay mat within confined areas as well as open water areas. It includes costs for on-site labor, equipment, and materials developed from previous work.

## Cost Analysis:

Cost for Organoclay Mat Placement for Technology Assignments (Lump Sum)

COST DATABASE CODE	DESCRIPTION	QTY	UNIT(S)	HPF	LABOR	ADJ LABOR	EQUIP	ADJ EQUIP	MATL	OTHER	UNMOD UC	UNMOD LIC	PC OH	PC PF	BUR LIC	COST SOURCE CITATION	COMMENTS
	Organoclay Mat Placement (Riverbanks)																
P23	Organoclay Mat Material and Placement (Confined)	34,848	SF	1.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$23.74	\$23.74	\$827,204.40	0%	0%	\$827,204	P Previous Work	Developed by Anchor QEA (2010)
	Organoclay Mat Placement (Confined)																
P23	Organoclay Mat Material and Placement (Confined)	139,392	SF	1.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$23.74	\$23.74	\$3,308,817.60	0%	0%	\$3,308,818	P Previous Work	Developed by Anchor QEA (2010)
	Organoclay Mat Placement (Open Water)																
P24	Organoclay Mat Material and Placement (Open)	531,432	SF	1.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$7.09	\$7.09	\$3,766,524.30	0%	0%	\$3,766,524	P Previous Work	Developed by Anchor QEA (2010)
												TOTAL UNIT COST:			\$7,902,546		

## Notes:

HTRW productivity factor is from Exhibit B-3 or B-4 of "A Guide to Developing and Documenting Cost Estimates During the Feasibility Study", EPA 2000

The Cost Database Code is a reference code for linking with line item cost information with the cost source database and is not otherwise used within these cost worksheets.

## Source of Cost Data:

NA Not Applicable - costs are from previous work or vendor quote

For citation references, the following sources apply:

MII (MII Assemblies), GSA (www.gsa.gov), FLC (www.flcdatcenter.com), A (Allowance), V (Vendor Quote), CW (Means CostWorks 2015), P (Previous Work), and FRTR (www.frtr.gov)

## Cost Adjustment Checklist:

FACTOR:

H&S Productivity (labor and equipment only)

Escalation to Base Year

Area Cost Factor

Subcontractor Overhead and Profit

Prime Contractor Overhead and Profit

## NOTES:

Field work will be in Level "D" PPE.

MII assembly costs include HPF adjustments.

2015 cost sources are not escalated (EF=1.00). All other costs are escalated based on the USACE CWCCIS, EM 1110-2-1304, Mar 2015.

An AF of 1.05 is used for Oregon, except that an AF of 1.00 (national unmodified average) is used for MII assembly costs and local vendor quotes.

It is assumed that home office OH is 8% and profit is 9% for the Prime Contractor. Professional labor overhead is 100%. Allowances and items with mandated costs such as per diem do not have overhead and profit applied.

Items previously developed by Anchor QEA (2010) already include contractor markups, therefore overhead and profit were not applied to those items.

It is assumed that OH is 1% and profit is 0% for vendor quotes for treatment and disposal at offsite disposal facilities. It is assumed that OH is 5% and profit is 0% for quotes for all other material vendor quotes.

## Abbreviations:

QTY	Quantity	ACR	Acres
EQUIP	Equipment	BCY	Bank Cubic Yard
MATL	Material	CLF	100 Linear Foot
HPF	HTRW Productivity Factor	DY	Days
ADJ LABOR	Adjusted Labor for HFP	EA	Each
ADJ EQUIP	Adjusted Equipment for HFP	LF	Linear Foot
UNMOD UC	Unmodified Unit Cost	HR	Hours
UNMOD LIC	Unmodified Line Item Cost	LB	Pounds
UNBUR LIC	Unburdened Line Item Cost	LCY	Loose Cubic Yard
PC OH	Prime Contractor Overhead	LS	Lump Sum
PC PF	Prime Contractor Profit	RL	Roll
BUR LIC	Burdened Line Item Cost	SY	Square Yard
		TN	Tons

TABLE CW-B21

Alternative B Cost Worksheet: CW-B21

Capital Cost Sub-Element  
Transload Facility Development

## COST WORKSHEET

Site: Portland Harbor Superfund Site  
 Location: Portland, Oregon  
 Phase: Draft Feasibility Study  
 Base Year: 2015

Prepared By: JN Date: 7/27/2015

Checked By: AS Date: 7/28/2015

## Work Statement:

This sub-element involves the development of a transload facility for facilitating offsite disposal of contaminated sediments. It includes costs for on-site labor, equipment, and materials developed from previous work. Transload facility is expected to be operated for 4 years, based on estimated construction duration.

## Cost Analysis:

Cost for Transload Facility Development (Lump Sum)

COST DATABASE CODE	DESCRIPTION	QTY	UNIT(S)	HPF	LABOR	ADJ LABOR	EQUIP	ADJ EQUIP	MATL	OTHER	UNMOD UC	UNMOD LIC	PC OH	PC PF	BUR LIC	COST SOURCE CITATION	COMMENTS
	Transload Facility Development																
P31	Transload Facility Permitting	1	LS	1.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$45,000.00	\$45,000.00	\$45,000.00	0%	0%	\$45,000	P Previous Work	Developed by Anchor QEA (2010)
P32	Transload Facility Development	1	LS	1.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$8,437,500.00	\$8,437,500.00	\$8,437,500.00	0%	0%	\$8,437,500	P Previous Work	Developed by Anchor QEA (2010)
P33	Yearly Property Lease	80	AC	1.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$26,437.50	\$26,437.50	\$2,115,000.00	0%	0%	\$2,115,000	P Previous Work	Developed by Anchor QEA (2010)
	Inspection and Monitoring of Transload Facility																
P34	Labor Inspections During Operations of Transload Facility	10.0	FTE	1.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$84,375.00	\$84,375.00	\$843,750.00	0%	0%	\$843,750	P Previous Work	Developed by Anchor QEA (2010)
P35	Environmental Monitoring During Offloading a Transload Facility	16	MO	1.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$16,875.00	\$16,875.00	\$270,000.00	0%	0%	\$270,000	P Previous Work	Developed by Anchor QEA (2010)
P36	Inspection and Monitoring Reporting for Transload Facility	4	YR	1.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$45,000.00	\$45,000.00	\$180,000.00	0%	0%	\$180,000	P Previous Work	Developed by Anchor QEA (2010)
TOTAL UNIT COST:															\$11,891,250		

## Notes:

HTRW productivity factor is from Exhibit B-3 or B-4 of "A Guide to Developing and Documenting Cost Estimates During the Feasibility Study", EPA 2000  
 The Cost Database Code is a reference code for linking with line item cost information with the cost source database and is not otherwise used within these cost worksheets.

## Source of Cost Data:

NA Not Applicable - costs are from previous work or vendor quote

For citation references, the following sources apply:

MII (MII Assemblies), GSA (www.gsa.gov), FLC (www.flcdatcenter.com), A (Allowance), V (Vendor Quote), CW (Means CostWorks 2015), P (Previous Work), and FRTR (www.frtr.gov)

## Cost Adjustment Checklist:

FACTOR:  
 H&S Productivity (labor and equipment only)  
 Escalation to Base Year  
 Area Cost Factor  
 Subcontractor Overhead and Profit  
 Prime Contractor Overhead and Profit

## NOTES:

Field work will be in Level "D" PPE.  
 MII assembly costs include HPF adjustments.  
 2015 cost sources are not escalated (EF=1.00). All other costs are escalated based on the USACE CWCCIS, EM 1110-2-1304, Mar 2015.  
 An AF of 1.05 is used for Oregon, except that an AF of 1.00 (national unmodified average) is used for MII assembly costs and local vendor quotes.  
 It is assumed that home office OH is 8% and profit is 9% for the Prime Contractor. Professional labor overhead is 100%. Allowances and items with mandated costs such as per diem do not have overhead and profit applied.  
 Items previously developed by Anchor QEA (2010) already include contractor markups, therefore overhead and profit were not applied to those items.  
 It is assumed that OH is 1% and profit is 0% for vendor quotes for treatment and disposal at offsite disposal facilities. It is assumed that OH is 5% and profit is 0% for quotes for all other material vendor quotes.

## Abbreviations:

QTY	Quantity	ACR	Acres
EQUIP	Equipment	BCY	Bank Cubic Yard
MATL	Material	CLF	100 Linear Foot
HPF	HTRW Productivity Factor	DY	Days
ADJ LABOR	Adjusted Labor for HPF	EA	Each
ADJ EQUIP	Adjusted Equipment for HPF	LF	Linear Foot
UNMOD UC	Unmodified Unit Cost	HR	Hours
UNMOD LIC	Unmodified Line Item Cost	LB	Pounds
UNBUR LIC	Unburdened Line Item Cost	LCY	Loose Cubic Yard
PC OH	Prime Contractor Overhead	LS	Lump Sum
PC PF	Prime Contractor Profit	RL	Roll
BUR LIC	Burdened Line Item Cost	SY	Square Yard
		TN	Tons

## TABLE CW-B22

<b>Alternative B</b>	<b>Cost Worksheet:</b>	<b>CW-B22</b>
----------------------	------------------------	---------------

## Capital Cost Sub-Element COST WORKSHEET

<b>Site:</b>	Portland Harbor Superfund Site	<b>Prepared By:</b>	JN	<b>Date:</b>	7/27/2015
<b>Location:</b>	Portland, Oregon				
<b>Phase:</b>	Draft Feasibility Study	<b>Checked By:</b>	AS	<b>Date:</b>	7/28/2015
<b>Base Year:</b>	2015				

Work Statement:

This sub-element involves sampling as part of monitored natural recovery for MNR, EMNR, and Broadcast GAC areas. It includes costs for on-site labor, equipment, and materials developed from previous work.

**Cost Analysis:**

Cost for Monitored Natural Recovery for MNR/EMNR and Broadcast GAC Areas (Lump Sum)

COST DATABASE CODE	DESCRIPTION	QTY	UNIT(S)	HPF	LABOR	ADJ LABOR	EQUIP	ADJ EQUIP	MATL	OTHER	UNMOD UC	UNMOD LIC	PC OH	PC PF	BUR LIC	COST SOURCE CITATION	COMMENTS
P25	Monitored Natural Recovery	2,554	AC	1.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$3,679.79	\$3,679.79	\$9,398,170.89	0%	0%	\$9,398,171	P Previous Work	Developed by Anchor QEA (2010)
												TOTAL UNIT COST:		\$9,398,171			

Notes:	Abbreviations:
--------	----------------

<p>HTRW productivity factor is from Exhibit B-3 or B-4 of "A Guide to Developing and Documenting Cost Estimates During the Feasibility Study", EPA 2000</p> <p>The Cost Database Code is a reference code for linking with item cost information with the cost source database and is not otherwise used within these cost worksheets.</p>			QTY	Quantity	ACR	Acres
	EQUIP	Equipment	BCY	Bank Cubic Yard		

Source of Cost Data:	HPF	HTRW Productivity Factor	DY	Days
----------------------	-----	--------------------------	----	------

NA	Not Applicable - costs are from previous work or vendor quote	ADJ LABOR	Adjusted Labor for HFP	EA	Each

For citation references, the following sources apply:

MII (MII Assemblies), GSA ( <a href="http://www.gsa.gov">www.gsa.gov</a> ), FLC ( <a href="http://www.flcdatcenter.com">www.flcdatcenter.com</a> ), A (Allowance), V (Vendor Quote), CW (Means CostWorks 2015), P (Previous Work), and FRTR ( <a href="http://www.frtr.gov">www.frtr.gov</a> )	UNMOD UC	Unmodified Unit Cost	HR	Hours
--	----------	----------------------	----	-------

<u>Cost Adjustment Checklist:</u>	<u>NOTES:</u>	UNBUR LIC	Unburdened Line Item Cost	LCY	Loose Cubic Yard
-----------------------------------	---------------	-----------	---------------------------	-----	------------------

NOTES:	UNBUR LIC	Unburdened Line Item Cost	LCY	Loose Cubic Yard
--------	-----------	---------------------------	-----	------------------

Field work will be in Level "D" PPE.	PC OH	Prime Contractor Overhead	LS	Lump Sum
--------------------------------------	-------	---------------------------	----	----------

MII assembly costs include HPF adjustments.	PC PF	Prime Contractor Profit	RL	Roll
---	-------	-------------------------	----	------

2015 cost sources are not escalated (EF=1.00). All other costs are escalated based on the USACE CWCCIS, EM 1110-2-1304, Mar 2015.

An AF of 1.05 is used for Oregon, except that an AF of 1.00 (national unmodified average) is used for MII assembly costs and local vendor quotes.

It is assumed that home office OH is 8% and profit is 9% for the Prime Contractor. Professional labor overhead is 100%. Allowances and items with mandated costs such as per diem do not have overhead and profit applied.

Items previously developed by Anchor QEA (2010) already include contractor markups, therefore overhead and profit were not applied to those items.

It is assumed that OH is 1% and profit is 0% for vendor quotes for treatment and disposal at offsite disposal facilities. It is assumed that OH is 5% and profit is 0% for quotes for all other material vendor quotes.

**Abbreviations:**

QTY	Quantity	ACR	Acres
EQUIP	Equipment	BCY	Bank Cubic Yard
MATL	Material	CLF	100 Linear Foot
HPF	HTRW Productivity Factor	DY	Days
ADJ LABOR	Adjusted Labor for HFP	EA	Each
ADJ EQUIP	Adjusted Equipment for HFP	LF	Linear Foot
UNMOD UC	Unmodified Unit Cost	HR	Hours
UNMOD LIC	Unmodified Line Item Cost	LB	Pounds
UNBUR LIC	Unburdened Line Item Cost	LCY	Loose Cubic Yard
PC OH	Prime Contractor Overhead	LS	Lump Sum
PC PF	Prime Contractor Profit	RL	Roll
BUR LIC	Burdened Line Item Cost	SY	Square Yard

## TABLE CW-B23

## COST WORKSHEET

<u>Cost Adjustment Checklist:</u>	<u>NOTES:</u>	UNBUR LIC	Unburdened Line Item Cost	LCY	Loose Cost
FACTOR:	Field work will be in Level "D" PPE.				
H&S Productivity (labor and equipment only)	Mill assembly costs include HPF adjustments.	PC OH	Prime Contractor Overhead	LS	Lump Sum
Escalation to Base Year	2015 cost sources are not escalated (EF=1.00). All other costs are escalated based on the USACE CWCCIS, EM 1110-2-1304, Mar 2015.	PC PF	Prime Contractor Profit	RL	Roll
Area Cost Factor	An AF of 1.05 is used for Oregon, except that an AF of 1.00 (national unmodified average) is used for Mill assembly costs and local vendor quotes.	BUR LIC	Burdened Line Item Cost	SY	Square Y
Subcontractor Overhead and Profit	It is assumed that home office OH is 8% and profit is 9% for the Prime Contractor. Professional labor overhead is 100%. Allowances and items with mandated costs such as per diem do not have overhead and profit applied.			TN	Tons
Prime Contractor Overhead and Profit	Items previously developed by Anchor QEA (2010) already include contractor markups, therefore overhead and profit were not applied to those items. It is assumed that OH is 1% and profit is 0% for vendor quotes for treatment and disposal of offsite disposal facilities. It is assumed that OH is 5% and profit is 0% for quotes for all other material vendor quotes.				

TABLE CW-B24

<b>Alternative B                      Cost Worksheet:    CW-B24</b>															COST WORKSHEET			
<b>Capital Cost Sub-Element</b> <b>Cap Area Monitoring and Reactive Layer Monitoring</b>																		
<b>Site:</b> Portland Harbor Superfund Site <b>Location:</b> Portland, Oregon <b>Phase:</b> Draft Feasibility Study <b>Base Year:</b> 2015															<b>Prepared By:</b> JN  <b>Checked By:</b> AS  <b>Date:</b> 7/27/2015  <b>Date:</b> 7/28/2015			
<b>Work Statement:</b> This sub-element involves sampling, surveying, data management, and reporting as part of cap and reactive layer monitoring. It includes costs for on-site labor, equipment, and materials developed from previous work.																		
<b>Cost Analysis:</b> Cost for Cap and Reactive Layer Monitoring (Lump Sum)																		
COST DATABASE CODE	DESCRIPTION	QTY	UNIT(S)	HPF	LABOR	ADJ LABOR	EQUIP	ADJ EQUIP	MATL	OTHER	UNMOD UC	UNMOD LIC	PC OH	PC PF	BUR LIC	COST SOURCE CITATION	COMMENTS	
	Cap Area Monitoring																	
P27	Cap Monitoring	73	AC	1.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$78,821.21	\$78,821.21	\$5,777,594.88	0%	0%	\$5,777,595	P   Previous Work	Developed by Anchor QEA (2010)	
	Reactive Layer Monitoring																	
P28	Reactive Layer Monitoring	82.9	AC	1.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$88,810.88	\$88,810.88	\$7,362,421.54	0%	0%	\$7,362,422	P   Previous Work	Developed by Anchor QEA (2010)	
															TOTAL UNIT COST:		\$13,140,017	
<b>Notes:</b> HTRW productivity factor is from Exhibit B-3 or B-4 of "A Guide to Developing and Documenting Cost Estimates During the Feasibility Study", EPA 2000 The Cost Database Code is a reference code for linking with line item cost information with the cost source database and is not otherwise used within these cost worksheets.																		
<b>Source of Cost Data:</b> NA   Not Applicable - costs are from previous work or vendor quote For citation references, the following sources apply: MII (MII Assemblies), GSA (www.gsa.gov), FLC (www.flcdatacenter.com), A (Allowance), V (Vendor Quote), CW (Means CostWorks 2015), P (Previous Work), and FRTR (www.frtr.gov)																		
<b>Cost Adjustment Checklist:</b>																		
<b>FACTOR:</b> Field work will be in Level "D" PPE.																		
H&S Productivity (labor and equipment only) MII assembly costs include HPF adjustments.																		
Escalation to Base Year 2015 cost sources are not escalated (EF=1.00). All other costs are escalated based on the USACE CWCCIS, EM 1110-2-1304, Mar 2015.																		
Area Cost Factor An AF of 1.05 is used for Oregon, except that an AF of 1.00 (national unmodified average) is used for MII assembly costs and local vendor quotes.																		
Subcontractor Overhead and Profit It is assumed that home office OH is 8% and profit is 9% for the Prime Contractor. Professional labor overhead is 100%. Allowances and items with mandated costs such as per diem do not have overhead and profit applied.																		
Prime Contractor Overhead and Profit Items previously developed by Anchor QEA (2010) already include contractor markups, therefore overhead and profit were not applied to those items.																		
It is assumed that OH is 1% and profit is 0% for vendor quotes for treatment and disposal at offsite disposal facilities. It is assumed that OH is 5% and profit is 0% for quotes for all other material vendor quotes.																		

TABLE CW-B25

**Alternative B** **Cost Worksheet: CW-B25**  
**Capital Cost Sub-Element**  
**Long-Term Maintenance for Capping, EMNR, and In Situ Treatment**

**COST WORKSHEET**

**Site:** Portland Harbor Superfund Site **Prepared By:** AB **Date:** 8/11/2015  
**Location:** Portland, Oregon  
**Phase:** Draft Feasibility Study **Checked By:** JN **Date:** 8/12/2015  
**Base Year:** 2015

**Work Statement:**

This sub-element involves replacement of 5% of the technology assignment layers as part of long-term maintenance. It includes costs for on-site labor, equipment, and materials developed from previous work.

**Cost Analysis:**

Cost for Long-Term Maintenance (Lump Sum)

COST DATABASE CODE	DESCRIPTION	QTY	UNIT(S)	HPF	LABOR	ADJ LABOR	EQUIP	ADJ EQUIP	MATL	OTHER	UNMOD UC	UNMOD LIC	PC OH	PC PF	BUR LIC	COST SOURCE CITATION	COMMENTS
<b>Mobilization / Demobilization</b>																	
M16	Mobilization/Demobilization for Long Term Maintenance	1	LS	1.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$61,545.99	\$61,545.99	\$61,545.99	0%	0%	\$61,546	A Previous Work	Assumes 1.6% of total capital costs per Lower Duwamish. See Calculations for derivation.
<b>Sand Placement for Technology Assignments</b>																	
<b>Sand Placement (Riverbank)</b>																	
P2	Sand Placement (Confined)	1,484	LCY	1.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$49.01	\$49.01	\$72,723.42	0%	0%	\$72,723	P Previous Work	Assume 5% of placement of additional material
M1	Sand	1,484	LCY	1.00	\$0.00	\$0.00	\$0.00	\$0.00	\$19.71	\$0.00	\$19.71	\$29,249.64	0%	0%	\$29,250	P Previous Work	Assume 5% of placement of additional material
<b>Sand Placement (Confined)</b>																	
P2	Sand Placement (Confined)	1,949	LCY	1.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$49.01	\$49.01	\$95,510.75	0%	0%	\$95,511	P Previous Work	Assume 5% of placement of additional material
M1	Sand	1,949	LCY	1.00	\$0.00	\$0.00	\$0.00	\$0.00	\$19.71	\$0.00	\$19.71	\$38,414.79	0%	0%	\$38,415	P Previous Work	Assume 5% of placement of additional material
<b>Sand Placement (Open Water)</b>																	
P6	Sand Placement (Open Water)	10,424	LCY	1.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$23.76	\$23.76	\$247,674.24	0%	0%	\$247,674	P Previous Work	Assume 5% of placement of additional material
M1	Sand	10,424	LCY	1.00	\$0.00	\$0.00	\$0.00	\$0.00	\$19.71	\$0.00	\$19.71	\$205,457.04	0%	0%	\$205,457	P Previous Work	Assume 5% of placement of additional material
<b>Beach Mix Placement for Technology Assignments</b>																	
<b>Beach Mix Placement (Riverbanks)</b>																	
P5	Beach Mix Placement (Confined)	278	LCY	1.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$58.50	\$58.50	\$16,263.00	0%	0%	\$16,263	P Previous Work	Assume 5% of placement of additional material
M5	ODOT 100 Beach Mix	278	LCY	1.00	\$0.00	\$0.00	\$0.00	\$0.00	\$57.59	\$0.00	\$57.59	\$16,010.02	0%	0%	\$16,010	P Previous Work	Assume 5% of placement of additional material
<b>Beach Mix Placement (Confined)</b>																	
P5	Beach Mix Placement (Confined)	74	LCY	1.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$58.50	\$58.50	\$4,329.00	0%	0%	\$4,329	P Previous Work	Assume 5% of placement of additional material
M5	ODOT 100 Beach Mix	74	LCY	1.00	\$0.00	\$0.00	\$0.00	\$0.00	\$57.59	\$0.00	\$57.59	\$4,261.66	0%	0%	\$4,262	P Previous Work	Assume 5% of placement of additional material
<b>Beach Mix Placement (Open Water)</b>																	
P39	Beach Mix Placement (Open Water)	388	LCY	1.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$28.34	\$28.34	\$10,995.44	0%	0%	\$10,995	P Previous Work	Assume 5% of placement of additional material
M5	ODOT 100 Beach Mix	388	LCY	1.00	\$0.00	\$0.00	\$0.00	\$0.00	\$57.59	\$0.00	\$57.59	\$22,344.92	0%	0%	\$22,345	P Previous Work	Assume 5% of placement of additional material
<b>Armor Placement for Technology Assignments</b>																	
<b>Armor Placement (Riverbanks)</b>																	
P3	ODOT 200 Placement (Confined)	226	LCY	1.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$58.50	\$58.50	\$13,221.00	0%	0%	\$13,221	P Previous Work	Assume 5% of placement of additional material
M2	ODOT 200 Armor	226	LCY	1.00	\$0.00	\$0.00	\$0.00	\$0.00	\$57.59	\$0.00	\$57.59	\$13,015.34	0%	0%	\$13,015	P Previous Work	Assume 5% of placement of additional material
<b>Armor Placement (Confined)</b>																	
P3	ODOT 200 Placement (Confined)	417	LCY	1.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$58.50	\$58.50	\$24,394.50	0%	0%	\$24,395	P Previous Work	Assume 5% of placement of additional material
M2	ODOT 200 Armor	417	LCY	1.00	\$0.00	\$0.00	\$0.00	\$0.00	\$57.59	\$0.00	\$57.59	\$24,015.03	0%	0%	\$24,015	P Previous Work	Assume 5% of placement of additional material
<b>Armor Placement (Open Water)</b>																	
P7	ODOT 200 Placement (Open Water)	456	LCY	1.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$28.34	\$28.34	\$12,922.47	0%	0%	\$12,922	P Previous Work	Assume 5% of placement of additional material
M2	ODOT 200 Armor	456	LCY	1.00	\$0.00	\$0.00	\$0.00	\$0.00	\$57.59	\$0.00	\$57.59	\$26,261.04	0%	0%	\$26,261	P Previous Work	Assume 5% of placement of additional material
<b>Reactive/GAC Placement for Technology Assignments</b>																	
<b>Reactive/GAC Placement (Riverbanks)</b>																	
P40	Carbon (AquaGate + PAC 5%) Placement (Confined)	29	TON	1.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$816.75	\$816.75	\$23,685.75	0%	0%	\$23,686	P Previous Work	Assume 5% of placement of additional material
M4	Carbon (AquaGate + PAC 5%)	29	TON	1.00	\$0.00	\$0.00	\$0.00	\$0.00	\$8,000.00	\$0.00	\$8,000.00	\$232,000.00	5%	0%	\$243,600	V Vendor Quote	Assume 5% of placement of additional material
<b>Reactive/GAC Placement (Confined)</b>																	
P40	Carbon (AquaGate + PAC 5%) Placement (Confined)	31	TON	1.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$816.75	\$816.75	\$25,319.25	0%	0%	\$25,319	P Previous Work	Assume 5% of placement of additional material
M4	Carbon (AquaGate + PAC 5%)	31	TON	1.00	\$0.00	\$0.00	\$0.00	\$0.00	\$8,000.00	\$0.00	\$8,000.00	\$248,000.00	5%	0%	\$260,400	V Vendor Quote	Assume 5% of placement of additional material
<b>Reactive/GAC Placement (Open Water)</b>																	
P41	Carbon (AquaGate + PAC 5%) Placement (Open Water)	229	TON	1.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$396.00	\$396.00	\$90,684.00	0%	0%	\$90,684	P Previous Work	Assume 5% of placement of additional material
M4	Carbon (AquaGate + PAC 5%)	229	TON	1.00	\$0.00	\$0.00	\$0.00	\$0.00	\$8,000.00	\$0.00	\$8,000.00	\$1,832,000.00	5%	0%	\$1,923,600	V Vendor Quote	Assume 5% of placement of additional material



TABLE CW-B25

**Alternative B**                      **Cost Worksheet: CW-B25**  
**Capital Cost Sub-Element**  
**Long-Term Maintenance for Capping, EMNR, and In Situ Treatment**

**COST WORKSHEET**

**Site:** Portland Harbor Superfund Site                      **Prepared By:** AB                      **Date:** 8/11/2015  
**Location:** Portland, Oregon  
**Phase:** Draft Feasibility Study                      **Checked By:** JN                      **Date:** 8/12/2015  
**Base Year:** 2015

**Work Statement:**

This sub-element involves replacement of 5% of the technology assignment layers as part of long-term maintenance. It includes costs for on-site labor, equipment, and materials developed from previous work.

**Cost Analysis:**

Cost for Long-Term Maintenance (Lump Sum)

COST DATABASE CODE	DESCRIPTION	QTY	UNIT(S)	HPF	LABOR	ADJ LABOR	EQUIP	ADJ EQUIP	MATL	OTHER	UNMOD UC	UNMOD LIC	PC OH	PC PF	BUR LIC	COST SOURCE CITATION	COMMENTS
<b>Geofabric for Riverbanks</b>																	
P51	Geotextile Installation	0.5	AC	1.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$7,060.20	\$7,060.20	\$3,530.10	8%	9%	\$4,156	P Previous Work	
M13	Geotextile	0.5	AC	1.00	\$0.00	\$0.00	\$0.00	\$0.00	\$5,687.39	\$0.00	\$5,687.39	\$2,843.70	5%	0%	\$2,986	V Vendor Quote	Assume 5% of placement of additional material
<b>Organoclay Mat Placement for Technology Assignments</b>																	
<b>Organoclay Mat Placement (Riverbanks)</b>																	
P23	(Confined)	1,742	SF	1.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$23.74	\$23.74	\$41,350.73	0%	0%	\$41,351	P Previous Work	Assume 5% of placement of additional material
<b>Organoclay Mat Placement (Confined)</b>																	
P23	(Confined)	6,970	SF	1.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$23.74	\$23.74	\$165,450.38	0%	0%	\$165,450	P Previous Work	Assume 5% of placement of additional material
<b>Organoclay Mat Placement (Open Water)</b>																	
P24	Organoclay Mat Material and Placement (Open)	26,572	SF	1.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$7.09	\$7.09	\$188,329.05	0%	0%	\$188,329	P Previous Work	Assume 5% of placement of additional material
<b>TOTAL UNIT COST:</b>															\$3,908,170		

**Notes:**

HTRW productivity factor is from Exhibit B-3 or B-4 of "A Guide to Developing and Documenting Cost Estimates During the Feasibility Study", EPA 2000  
The Cost Database Code is a reference code for linking with line item cost information with the cost source database and is not otherwise used within these cost worksheets.

**Source of Cost Data:**

NA Not Applicable - costs are from previous work or vendor quote  
For citation references, the following sources apply:  
MII (MII Assemblies), GSA (www.gsa.gov), FLC (www.flcdatcenter.com), A (Allowance), V (Vendor Quote), CW (Means CostWorks 2015), P (Previous Work), and FRTR (www.frtr.gov)

**Cost Adjustment Checklist:**

FACTOR:  
H&S Productivity (labor and equipment only)  
Escalation to Base Year  
Area Cost Factor  
Subcontractor Overhead and Profit  
Prime Contractor Overhead and Profit

**NOTES:**

Field work will be in Level "D" PPE.  
MII assembly costs include HPF adjustments.  
2015 cost sources are not escalated (EF=1.00). All other costs are escalated based on the USACE CWCCIS, EM 1110-2-1304, Mar 2015.  
An AF of 1.05 is used for Oregon, except that an AF of 1.00 (national unmodified average) is used for MII assembly costs and local vendor quotes.  
It is assumed that home office OH is 8% and profit is 9% for the Prime Contractor. Professional labor overhead is 100%. Allowances and items with mandated costs such as per diem do not have overhead and profit applied.  
Items previously developed by Anchor QEA (2010) already include contractor markups, therefore overhead and profit were not applied to those items.  
It is assumed that OH is 1% and profit is 0% for vendor quotes for treatment and disposal at offsite disposal facilities. It is assumed that OH is 5% and profit is 0% for quotes for all other material vendor quotes.

**Abbreviations:**

QTY	Quantity	ACR	Acre
EQUIP	Equipment	BCY	Bank Cubic Yard
MATL	Material	CLF	100 Linear Foot
HPF	HTRW Productivity Factor	DY	Days
ADJ LABOR	Adjusted Labor for HFP	EA	Each
ADJ EQUIP	Adjusted Equipment for HFP	LF	Linear Foot
UNMOD UC	Unmodified Unit Cost	HR	Hours
UNMOD LIC	Unmodified Line Item Cost	LB	Pounds
UNBUR LIC	Unburdened Line Item Cost	LCY	Loose Cubic Yard
PC OH	Prime Contractor Overhead	LS	Lump Sum
PC PF	Prime Contractor Profit	RL	Roll
BUR LIC	Burdened Line Item Cost	SY	Square Yard
		TN	Tons

TABLE CW-B26

**Alternative B**  
**Capital Cost Sub-Element**  
**5-Year Site Review**

**Cost Worksheet: CW-B26**

**COST WORKSHEET**

**Site:** Portland Harbor Superfund Site  
**Location:** Portland, Oregon  
**Phase:** Draft Feasibility Study  
**Base Year:** 2015

**Prepared By:** JN **Date:** 7/27/2015

**Checked By:** AS **Date:** 7/28/2015

**Work Statement:**

This sub-element involves the site visit and 5-year site review report. The following cost includes labor, material and shipping costs for site visits and 5-year site review reports.

**Cost Analysis:**

Cost for 5-Year Site Review (Lump Sum)

COST DATABASE CODE	DESCRIPTION	QTY	UNIT(S)	HPF	LABOR	ADJ LABOR	EQUIP	ADJ EQUIP	MATL	OTHER	UNMOD UC	UNMOD LIC	PC OH	PC PF	BUR LIC	COST SOURCE CITATION	COMMENTS
L11	Project Manager	300	HR	1.00	\$82.17	\$82.17	\$0.00	\$0.00	\$0.00	\$0.00	\$82.17	\$24,651.00	100%	9%	\$53,739	FLC FLCDataCenter	
L4	Environmental Engineer	600	HR	1.00	\$48.91	\$48.91	\$0.00	\$0.00	\$0.00	\$0.00	\$48.91	\$29,346.00	100%	9%	\$63,974	FLC FLCDataCenter	
L6	Environmental Scientist	900	HR	1.00	\$37.70	\$37.70	\$0.00	\$0.00	\$0.00	\$0.00	\$37.70	\$33,930.00	100%	9%	\$73,967	FLC FLCDataCenter	
L12	Quality Control Engineer	120	HR	1.00	\$64.99	\$64.99	\$0.00	\$0.00	\$0.00	\$0.00	\$64.99	\$7,798.80	100%	9%	\$17,001	FLC FLCDataCenter	
L1	CAD Drafter	300	HR	1.00	\$31.31	\$31.31	\$0.00	\$0.00	\$0.00	\$0.00	\$31.31	\$9,393.00	100%	9%	\$20,477	FLC FLCDataCenter	
L3	Clerks, Typist, Bookkeeper & Receptionist	300	HR	1.00	\$19.89	\$19.89	\$0.00	\$0.00	\$0.00	\$0.00	\$19.89	\$5,967.00	100%	9%	\$13,008	FLC FLCDataCenter	
M14	Copy and Shipping Allowance	1	LS	1.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$1,500.00	\$1,500.00	\$1,500.00	0%	0%	\$1,500	A Allowance	
<b>TOTAL UNIT COST:</b>															<b>\$243,666</b>		

**Notes:**

HTRW productivity factor is from Exhibit B-3 or B-4 of "A Guide to Developing and Documenting Cost Estimates During the Feasibility Study", EPA 2000  
The Cost Database Code is a reference code for linking with line item cost information with the cost source database and is not otherwise used within these cost worksheets.

**Source of Cost Data:**

NA Not Applicable - costs are from previous work or vendor quote

For citation references, the following sources apply:

MII (MII Assemblies), GSA (www.gsa.gov), FLC (www.flcdatacenter.com), A (Allowance), V (Vendor Quote), CW (Means CostWorks 2015), P (Previous Work), and FRTR (www.frtr.gov)

**Cost Adjustment Checklist:**

FACTOR:  
H&S Productivity (labor and equipment only)  
Escalation to Base Year  
Area Cost Factor  
Subcontractor Overhead and Profit  
Prime Contractor Overhead and Profit

**NOTES:**

Field work will be in Level "D" PPE.  
MII assembly costs include HPF adjustments.  
2015 cost sources are not escalated (EF=1.00). All other costs are escalated based on the USACE CWCCIS, EM 1110-2-1304, Mar 2015.  
An AF of 1.05 is used for Oregon, except that an AF of 1.00 (national unmodified average) is used for MII assembly costs and local vendor quotes.  
It is assumed that home office OH is 8% and profit is 9% for the Prime Contractor. Professional labor overhead is 100%. Allowances and items with mandated costs such as per diem do not have overhead and profit applied.  
Items previously developed by Anchor QEA (2010) already include contractor markups, therefore overhead and profit were not applied to those items.  
It is assumed that OH is 1% and profit is 0% for vendor quotes for treatment and disposal at offsite disposal facilities. It is assumed that OH is 5% and profit is 0% for quotes for all other material vendor quotes.

**Abbreviations:**

QTY	Quantity	ACR	Acres
EQUIP	Equipment	BCY	Bank Cubic Yard
MATL	Material	CLF	100 Linear Foot
HPF	HTRW Productivity Factor	DY	Days
ADJ LABOR	Adjusted Labor for HFP	EA	Each
ADJ EQUIP	Adjusted Equipment for HFP	LF	Linear Foot
UNMOD UC	Unmodified Unit Cost	HR	Hours
UNMOD LIC	Unmodified Line Item Cost	LB	Pounds
UNBUR LIC	Unburdened Line Item Cost	LCY	Loose Cubic Yard
PC OH	Prime Contractor Overhead	LS	Lump Sum
PC PF	Prime Contractor Profit	RL	Roll
BUR LIC	Burdened Line Item Cost	SY	Square Yard
		TN	Tons

**Cost Worksheets**  
**Alternative D**

TABLE CW-D1

<div style="display: flex; justify-content: space-between;"> <div> <b>Alternative D</b>  <b>Capital Cost Sub-Element</b>  <b>Mobilization / Demobilization</b> </div> <div> <b>Cost Worksheet: CW-D1</b> </div> <div> <b>COST WORKSHEET</b> </div> </div>																																																																					
<b>Site:</b> Portland Harbor Superfund Site <b>Location:</b> Portland, Oregon <b>Phase:</b> Draft Feasibility Study <b>Base Year:</b> 2015												<b>Prepared By:</b> AB  <b>Checked By:</b> JN			<b>Date:</b> 8/11/2015  <b>Date:</b> 8/12/2015																																																						
<b>Work Statement:</b> This sub-element involves mobilization and demobilization of all the required equipment to and from the site respectively.																																																																					
<b>Cost Analysis:</b> Cost for Mobilization/Demobilization (Lump Sum)																																																																					
COST DATABASE CODE	DESCRIPTION	QTY	UNIT(S)	HPF	LABOR	ADJ LABOR	EQUIP	ADJ EQUIP	MATL	OTHER	UNMOD UC	UNMOD LIC	PC OH	PC PF	BUR LIC	COST SOURCE CITATION	COMMENTS																																																				
M15	Mobilization/Demobilization	1	LS	1.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$12,368,000.00	\$12,368,000.00	\$12,368,000.00	0%	0%	\$12,368,000	A Previous Work	Assumes 1.6% of total capital costs per Lower Duwamish. See Calculations for derivation.																																																				
												<b>TOTAL UNIT COST:</b>		\$12,368,000																																																							
<div style="display: flex; justify-content: space-between;"> <div style="width: 60%;"> <b>Notes:</b>            HTRW productivity factor is from Exhibit B-3 or B-4 of "A Guide to Developing and Documenting Cost Estimates During the Feasibility Study", EPA 2000            The Cost Database Code is a reference code for linking with line item cost information with the cost source database and is not otherwise used within these cost worksheets.         </div> <div style="width: 35%;"> <b>Abbreviations:</b>  <table style="width: 100%; font-size: small;"> <tr><td>QTY</td><td>Quantity</td><td>ACR</td><td>Acres</td></tr> <tr><td>EQUIP</td><td>Equipment</td><td>BCY</td><td>Bank Cubic Yard</td></tr> <tr><td>MATL</td><td>Material</td><td>CLF</td><td>100 Linear Foot</td></tr> <tr><td>HPF</td><td>HTRW Productivity Factor</td><td>DY</td><td>Days</td></tr> <tr><td>ADJ LABOR</td><td>Adjusted Labor for HFP</td><td>EA</td><td>Each</td></tr> <tr><td>ADJ EQUIP</td><td>Adjusted Equipment for HFP</td><td>LF</td><td>Linear Foot</td></tr> <tr><td>UNMOD UC</td><td>Unmodified Unit Cost</td><td>HR</td><td>Hours</td></tr> <tr><td>UNMOD LIC</td><td>Unmodified Line Item Cost</td><td>LB</td><td>Pounds</td></tr> <tr><td>UNBUR LIC</td><td>Unburdened Line Item Cost</td><td>LCY</td><td>Loose Cubic Yard</td></tr> <tr><td>PC OH</td><td>Prime Contractor Overhead</td><td>LS</td><td>Lump Sum</td></tr> <tr><td>PC PF</td><td>Prime Contractor Profit</td><td>RL</td><td>Roll</td></tr> <tr><td>BUR LIC</td><td>Burdened Line Item Cost</td><td>SY</td><td>Square Yard</td></tr> <tr><td></td><td></td><td>TN</td><td>Tons</td></tr> </table> </div> </div>																		QTY	Quantity	ACR	Acres	EQUIP	Equipment	BCY	Bank Cubic Yard	MATL	Material	CLF	100 Linear Foot	HPF	HTRW Productivity Factor	DY	Days	ADJ LABOR	Adjusted Labor for HFP	EA	Each	ADJ EQUIP	Adjusted Equipment for HFP	LF	Linear Foot	UNMOD UC	Unmodified Unit Cost	HR	Hours	UNMOD LIC	Unmodified Line Item Cost	LB	Pounds	UNBUR LIC	Unburdened Line Item Cost	LCY	Loose Cubic Yard	PC OH	Prime Contractor Overhead	LS	Lump Sum	PC PF	Prime Contractor Profit	RL	Roll	BUR LIC	Burdened Line Item Cost	SY	Square Yard			TN	Tons
QTY	Quantity	ACR	Acres																																																																		
EQUIP	Equipment	BCY	Bank Cubic Yard																																																																		
MATL	Material	CLF	100 Linear Foot																																																																		
HPF	HTRW Productivity Factor	DY	Days																																																																		
ADJ LABOR	Adjusted Labor for HFP	EA	Each																																																																		
ADJ EQUIP	Adjusted Equipment for HFP	LF	Linear Foot																																																																		
UNMOD UC	Unmodified Unit Cost	HR	Hours																																																																		
UNMOD LIC	Unmodified Line Item Cost	LB	Pounds																																																																		
UNBUR LIC	Unburdened Line Item Cost	LCY	Loose Cubic Yard																																																																		
PC OH	Prime Contractor Overhead	LS	Lump Sum																																																																		
PC PF	Prime Contractor Profit	RL	Roll																																																																		
BUR LIC	Burdened Line Item Cost	SY	Square Yard																																																																		
		TN	Tons																																																																		
<div style="display: flex; justify-content: space-between;"> <div style="width: 45%;"> <b>Source of Cost Data:</b>            NA Not Applicable - costs are from previous work or vendor quote            For citation references, the following sources apply:            MII (MII Assemblies), GSA (www.gsa.gov), FLC (www.flcdatabase.com), A (Allowance), V (Vendor Quote), CW (Means CostWorks 2015), P (Previous Work), and FRTR (www.frtr.gov)         </div> <div style="width: 50%;"> <b>NOTES:</b>            Field work will be in Level "D" PPE.            MII assembly costs include HPF adjustments.            2015 cost sources are not escalated (EF=1.00). All other costs are escalated based on the USACE CWCCIS, EM 1110-2-1304, Mar 2015.            An AF of 1.05 is used for Oregon, except that an AF of 1.00 (national unmodified average) is used for MII assembly costs and local vendor quotes.            It is assumed that home office OH is 8% and profit is 9% for the Prime Contractor. Professional labor overhead is 100%. Allowances and items with mandated costs such as per diem do not have overhead and profit applied.            Items previously developed by Anchor QEA (2010) already include contractor markups, therefore overhead and profit were not applied to those items.            It is assumed that OH is 1% and profit is 0% for vendor quotes for treatment and disposal at offsite disposal facilities. It is assumed that OH is 5% and profit is 0% for quotes for all other material vendor quotes.         </div> </div>																																																																					
<b>Cost Adjustment Checklist:</b> FACTOR: H&S Productivity (labor and equipment only) Escalation to Base Year Area Cost Factor Subcontractor Overhead and Profit Prime Contractor Overhead and Profit																																																																					

TABLE CW-D2

Alternative D

Capital Cost Sub-Element

Institutional Controls

Cost Worksheet:

CW-D2

COST WORKSHEET

Site:

Portland Harbor Superfund Site

Prepared By:

JN

Date:

7/27/2015

Location:

Portland, Oregon

Checked By:

AS

Date:

7/28/2015

Phase:

Draft Feasibility Study

Base Year:

2015

Work Statement:

This sub-element involves implementation of institutional controls for the site. The following cost includes labor and materials to develop legal documents for institutional controls and cost for document submission and recording.

Cost Analysis:

Cost for Institutional Controls (Lump Sum)

COST DATABASE CODE	DESCRIPTION	QTY	UNIT(S)	HPF	LABOR	ADJ LABOR	EQUIP	ADJ EQUIP	MATL	OTHER	UNMOD UC	UNMOD LIC	PC OH	PC PF	BUR LIC	COST SOURCE CITATION	COMMENTS
	Informational Devices - Fish Consumption Advisory																
L11	Project Manager	800	HR	1.00	\$82.17	\$82.17	\$0.00	\$0.00	\$0.00	\$0.00	\$82.17	\$65,736.00	100%	9%	\$143,304	FLC FLCDataCenter	
L4	Environmental Engineer	500	HR	1.00	\$48.91	\$48.91	\$0.00	\$0.00	\$0.00	\$0.00	\$48.91	\$24,455.00	100%	9%	\$53,312	FLC FLCDataCenter	
L6	Environmental Scientist	800	HR	1.00	\$37.70	\$37.70	\$0.00	\$0.00	\$0.00	\$0.00	\$37.70	\$30,160.00	100%	9%	\$65,749	FLC FLCDataCenter	
L3	Clerks, Typist, Bookkeeper & Receptionist	300	HR	1.00	\$19.89	\$19.89	\$0.00	\$0.00	\$0.00	\$0.00	\$19.89	\$5,967.00	100%	9%	\$13,008	FLC FLCDataCenter	
L5	Environmental Lawyer	150	HR	1.00	\$71.72	\$71.72	\$0.00	\$0.00	\$0.00	\$0.00	\$71.72	\$10,758.00	100%	9%	\$23,452	FLC FLCDataCenter	
L13	Paralegal	300	HR	1.00	\$29.56	\$29.56	\$0.00	\$0.00	\$0.00	\$0.00	\$29.56	\$8,868.00	100%	9%	\$19,332	FLC FLCDataCenter	
	Informational Devices - Regulated Navigation Area (RNA) Setup																
L11	Project Manager	150	HR	1.00	\$82.17	\$82.17	\$0.00	\$0.00	\$0.00	\$0.00	\$82.17	\$12,325.50	100%	9%	\$26,870	FLC FLCDataCenter	
L4	Environmental Engineer	100	HR	1.00	\$48.91	\$48.91	\$0.00	\$0.00	\$0.00	\$0.00	\$48.91	\$4,891.00	100%	9%	\$10,662	FLC FLCDataCenter	
L5	Environmental Lawyer	80	HR	2.00	\$71.72	\$35.86	\$0.00	\$0.00	\$0.00	\$0.00	\$35.86	\$2,868.80	100%	9%	\$6,254	FLC FLCDataCenter	
L13	Paralegal	160	HR	1.00	\$29.56	\$29.56	\$0.00	\$0.00	\$0.00	\$0.00	\$29.56	\$4,729.60	100%	9%	\$10,311	FLC FLCDataCenter	
A1	18' Boat	80	HR	1.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$28.02	\$28.02	\$2,241.60	8%	9%	\$2,639	MII MII Assembly	For buoy setup
L17	Boat Operator	80	HR	1.00	\$33.16	\$33.16	\$0.00	\$0.00	\$0.00	\$0.00	\$33.16	\$2,652.80	100%	9%	\$5,783	FLC FLCDataCenter	
L8	Field Technician	80	HR	1.00	\$31.42	\$31.42	\$0.00	\$0.00	\$0.00	\$0.00	\$31.42	\$2,513.60	100%	9%	\$5,480	FLC FLCDataCenter	
M21	Buoy	120	EA	1.00	\$0.00	\$0.00	\$0.00	\$0.00	\$421.76	\$0.00	\$421.76	\$50,611.20	5%	0%	\$53,142	V Vendor Quote	Quote - Go2Marine
	Proprietary Controls																
L5	Environmental Lawyer	200	HR	1.00	\$71.72	\$71.72	\$0.00	\$0.00	\$0.00	\$0.00	\$71.72	\$14,344.00	100%	9%	\$31,270	FLC FLCDataCenter	
L13	Paralegal	250	HR	1.00	\$29.56	\$29.56	\$0.00	\$0.00	\$0.00	\$0.00	\$29.56	\$7,390.00	100%	9%	\$16,110	FLC FLCDataCenter	
L3	Clerks, Typist, Bookkeeper & Receptionist	150	HR	1.00	\$19.89	\$19.89	\$0.00	\$0.00	\$0.00	\$0.00	\$19.89	\$2,983.50	100%	9%	\$6,504	FLC FLCDataCenter	
	Enforcement Tools																
L5	Environmental Lawyer	4,200	HR	1.00	\$71.72	\$71.72	\$0.00	\$0.00	\$0.00	\$0.00	\$71.72	\$301,224.00	100%	9%	\$696,668	FLC FLCDataCenter	
L13	Paralegal	5,250	HR	1.00	\$29.56	\$29.56	\$0.00	\$0.00	\$0.00	\$0.00	\$29.56	\$155,190.00	100%	9%	\$338,314	FLC FLCDataCenter	
L3	Clerks, Typist, Bookkeeper & Receptionist	2,100	HR	1.00	\$19.89	\$19.89	\$0.00	\$0.00	\$0.00	\$0.00	\$19.89	\$41,769.00	100%	9%	\$91,056	FLC FLCDataCenter	
TOTAL UNIT COST:															\$1,579,220		

Notes:

HTRW productivity factor is from Exhibit B-3 or B-4 of "A Guide to Developing and Documenting Cost Estimates During the Feasibility Study", EPA 2000

The Cost Database Code is a reference code for linking with line item cost information with the cost source database and is not otherwise used within these cost worksheets.

Source of Cost Data:

NA Not Applicable - costs are from previous work or vendor quote

For citation references, the following sources apply:

MII (MII Assemblies), GSA (www.gsa.gov), FLC (www.flcdatcenter.com), A (Allowance), V (Vendor Quote), CW (Means CostWorks 2015), P (Previous Work), and FRTR (www.ftrr.org)

Cost Adjustment Checklist:

FACTOR:

H&S Productivity (labor and equipment only)

Escalation to Base Year

Area Cost Factor

Subcontractor Overhead and Profit

Prime Contractor Overhead and Profit

NOTES:

Field work will be in Level "D" PPE.

MII assembly costs include HPF adjustments.

2015 cost sources are not escalated (EF=1.00). All other costs are escalated based on the USACE WCCIS, EM 1110-2-1304, Mar 2015.

An AF of 1.05 is used for Oregon, except that an AF of 1.00 (national unmodified average) is used for MII assembly costs and local vendor quotes.

It is assumed that home office OH is 8% and profit is 9% for the Prime Contractor. Professional labor overhead is 100%. Allowances and items with mandated costs such as per diem do not have overhead and profit applied.

Items previously developed by Anchor QEA (2010) already include contractor markups, therefore overhead and profit were not applied to those items.

It is assumed that OH is 1% and profit is 0% for vendor quotes for treatment and disposal at offsite disposal facilities. It is assumed that OH is 5% and profit is 0% for quotes for all other material vendor quotes.

Abbreviations:

QTY Quantity

EQUIP Equipment

MATL Material

HPF HTRW Productivity Factor

ADJ LABOR Adjusted Labor for HFP

ADJ EQUIP Adjusted Equipment for HFP

UNMOD UC Unmodified Unit Cost

UNMOD LIC Unmodified Line Item Cost

UNBUR LIC Unburdened Line Item Cost

PC OH Prime Contractor Overhead

PC PF Prime Contractor Profit

BUR LIC Burdened Line Item Cost

ACR Acres

BCY Bank Cubic Yard

CLF 100 Linear Foot

DY Days

EA Each

LF Linear Foot

HR Hours

LB Pounds

LCY Loose Cubic Yard

LS Lump Sum

RL Roll

SY Square Yard

TN Tons

## TABLE CW-D3

Alternative D Cost Worksheet: CW-D3

## Capital Cost Sub-Element

## Evaluating and Updating Institutional Controls

## COST WORKSHEET

Site: Portland Harbor Superfund Site  
 Location: Portland, Oregon  
 Phase: Draft Feasibility Study  
 Base Year: 2015

Prepared By: JN Date: 7/27/2015

Checked By: AS Date: 7/28/2015

## Work Statement:

This sub-element involves evaluating and updating of institutional controls for the site. The following cost includes labor and materials to required for evaluating and updating institutional controls every 5 years.

## Cost Analysis:

Cost for Evaluating and Updating Institutional Controls (Lump Sum)

COST DATABASE CODE	DESCRIPTION	QTY	UNIT(S)	HPF	LABOR	ADJ LABOR	EQUIP	ADJ EQUIP	MATL	OTHER	UNMOD UC	UNMOD LIC	PC OH	PC PF	BUR LIC	COST SOURCE CITATION	COMMENTS
	Informational Devices - Fish Consumption Advisory																
L11	Project Manager	80	HR	1.00	\$82.17	\$82.17	\$0.00	\$0.00	\$0.00	\$0.00	\$82.17	\$6,573.60	100%	9%	\$14,330	FLC FLCDataCenter	Assumes 10% of initial costs for updating periodically
L4	Environmental Engineer	50	HR	1.00	\$48.91	\$48.91	\$0.00	\$0.00	\$0.00	\$0.00	\$48.91	\$2,445.50	100%	9%	\$5,331	FLC FLCDataCenter	Assumes 10% of initial costs for updating periodically
L6	Environmental Scientist	80	HR	1.00	\$37.70	\$37.70	\$0.00	\$0.00	\$0.00	\$0.00	\$37.70	\$3,016.00	100%	9%	\$6,575	FLC FLCDataCenter	Assumes 10% of initial costs for updating periodically
L3	Clerks, Typist, Bookkeeper & Receptionist	30	HR	1.00	\$19.89	\$19.89	\$0.00	\$0.00	\$0.00	\$0.00	\$19.89	\$596.70	100%	9%	\$1,301	FLC FLCDataCenter	Assumes 10% of initial costs for updating periodically
L5	Environmental Lawyer	15	HR	1.00	\$71.72	\$71.72	\$0.00	\$0.00	\$0.00	\$0.00	\$71.72	\$1,075.80	100%	9%	\$2,345	FLC FLCDataCenter	Assumes 10% of initial costs for updating periodically
L13	Paralegal	30	HR	1.00	\$29.56	\$29.56	\$0.00	\$0.00	\$0.00	\$0.00	\$29.56	\$886.80	100%	9%	\$1,933	FLC FLCDataCenter	Assumes 10% of initial costs for updating periodically
	Informational Devices - Regulated Navigation Area (RNA) Setup																
L11	Project Manager	15	HR	1.00	\$82.17	\$82.17	\$0.00	\$0.00	\$0.00	\$0.00	\$82.17	\$1,232.55	100%	9%	\$2,687	FLC FLCDataCenter	Assumes 10% of initial costs for updating periodically
L4	Environmental Engineer	10	HR	1.00	\$48.91	\$48.91	\$0.00	\$0.00	\$0.00	\$0.00	\$48.91	\$489.10	100%	9%	\$1,066	FLC FLCDataCenter	Assumes 10% of initial costs for updating periodically
L5	Environmental Lawyer	8	HR	2.00	\$71.72	\$35.86	\$0.00	\$0.00	\$0.00	\$0.00	\$35.86	\$286.88	100%	9%	\$625	FLC FLCDataCenter	Assumes 10% of initial costs for updating periodically
L13	Paralegal	16	HR	1.00	\$29.56	\$29.56	\$0.00	\$0.00	\$0.00	\$0.00	\$29.56	\$472.96	100%	9%	\$1,031	FLC FLCDataCenter	Assumes 10% of initial costs for updating periodically
A1	18' Boat	80	HR	1.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$28.02	\$28.02	\$2,241.60	8%	9%	\$2,639	MII MII Assembly	For buoy setup
L17	Boat Operator	80	HR	1.00	\$33.16	\$33.16	\$0.00	\$0.00	\$0.00	\$0.00	\$33.16	\$2,652.80	100%	9%	\$5,783	FLC FLCDataCenter	
L8	Field Technician	80	HR	1.00	\$31.42	\$31.42	\$0.00	\$0.00	\$0.00	\$0.00	\$31.42	\$2,513.60	100%	9%	\$5,480	FLC FLCDataCenter	
M21	Buoy	120	EA	1.00	\$0.00	\$0.00	\$0.00	\$0.00	\$421.76	\$0.00	\$421.76	\$50,611.20	5%	0%	\$53,142	V Vendor Quote	Quote - Go2Marine
	Proprietary Controls																
L5	Environmental Lawyer	20	HR	1.00	\$71.72	\$71.72	\$0.00	\$0.00	\$0.00	\$0.00	\$71.72	\$1,434.40	100%	9%	\$3,127	FLC FLCDataCenter	Assumes 10% of initial costs for updating periodically
L13	Paralegal	25	HR	1.00	\$29.56	\$29.56	\$0.00	\$0.00	\$0.00	\$0.00	\$29.56	\$739.00	100%	9%	\$1,611	FLC FLCDataCenter	Assumes 10% of initial costs for updating periodically
L3	Clerks, Typist, Bookkeeper & Receptionist	15	HR	1.00	\$19.89	\$19.89	\$0.00	\$0.00	\$0.00	\$0.00	\$19.89	\$298.35	100%	9%	\$650	FLC FLCDataCenter	Assumes 10% of initial costs for updating periodically
	Enforcement Tools																
L5	Environmental Lawyer	420	HR	1.00	\$71.72	\$71.72	\$0.00	\$0.00	\$0.00	\$0.00	\$71.72	\$30,122.40	100%	9%	\$65,667	FLC FLCDataCenter	Assumes 10% of initial costs for updating periodically
L13	Paralegal	525	HR	1.00	\$29.56	\$29.56	\$0.00	\$0.00	\$0.00	\$0.00	\$29.56	\$15,519.00	100%	9%	\$33,831	FLC FLCDataCenter	Assumes 10% of initial costs for updating periodically
L3	Clerks, Typist, Bookkeeper & Receptionist	210	HR	1.00	\$19.89	\$19.89	\$0.00	\$0.00	\$0.00	\$0.00	\$19.89	\$4,176.90	100%	9%	\$9,106	FLC FLCDataCenter	Assumes 10% of initial costs for updating periodically
TOTAL UNIT COST:															\$218,260		

## Notes:

HTRW productivity factor is from Exhibit B-3 or B-4 of "A Guide to Developing and Documenting Cost Estimates During the Feasibility Study", EPA 2000  
 The Cost Database Code is a reference code for linking with line item cost information with the cost source database and is not otherwise used within these cost worksheets.

## Source of Cost Data:

NA Not Applicable - costs are from previous work or vendor quote

For citation references, the following sources apply:

MII (MII Assemblies), GSA (www.gsa.gov), FLC (www.flcdatcenter.com), A (Allowance), V (Vendor Quote), CW (Means CostWorks 2015), P (Previous Work), and FRTR (www.ftrr.org)

## Cost Adjustment Checklist:

FACTOR:  
 H&S Productivity (labor and equipment only)  
 Escalation to Base Year  
 Area Cost Factor  
 Subcontractor Overhead and Profit  
 Prime Contractor Overhead and Profit

## NOTES:

Field work will be in Level "D" PPE.

MII assembly costs include HPF adjustments.

2015 cost sources are not escalated (EF=1.00). All other costs are escalated based on the USACE WCCIS, EM 1110-2-1304, Mar 2015.

An AF of 1.05 is used for Oregon, except that an AF of 1.00 (national unmodified average) is used for MII assembly costs and local vendor quotes.

It is assumed that home office OH is 8% and profit is 9% for the Prime Contractor. Professional labor overhead is 100%. Allowances and items with mandated costs such as per diem do not have overhead and profit applied.

Items previously developed by Anchor QEA (2010) already include contractor markups, therefore overhead and profit were not applied to those items.

It is assumed that OH is 1% and profit is 0% for vendor quotes for treatment and disposal at offsite disposal facilities. It is assumed that OH is 5% and profit is 0% for quotes for all other material vendor quotes.

## Abbreviations:

QTY	Quantity	ACR	Acre
EQUIP	Equipment	BCY	Bank Cubic Yard
MATL	Material	CLF	100 Linear Foot
HPF	HTRW Productivity Factor	DY	Days
ADJ LABOR	Adjusted Labor for HFP	EA	Each
ADJ EQUIP	Adjusted Equipment for HFP	LF	Linear Foot
UNMOD UC	Unmodified Unit Cost	HR	Hours
UNMOD LIC	Unmodified Line Item Cost	LB	Pounds
UNBUR LIC	Unburdened Line Item Cost	LCY	Loose Cubic Yard
PC OH	Prime Contractor Overhead	LS	Lump Sum
PC PF	Prime Contractor Profit	RL	Roll
BUR LIC	Burdened Line Item Cost	SY	Square Yard
		TN	Tons

TABLE CW-D5

## COST WORKSHEET

<b>Prepared By:</b> JN	<b>Date:</b> 7/27/2015
<b>Checked By:</b> AS	<b>Date:</b> 7/28/2015

This sub-element involves removal and disposal of debris for all areas prior to remedial activities. It includes costs for on-site labor, equipment, and materials developed from previous work.

Cost for Debris Removal and Disposal (Lump Sum)	
---	--

COST DATABASE CODE	DESCRIPTION	QTY	UNIT(S)	HPF	LABOR	ADJ LABOR	EQUIP	ADJ EQUIP	MATL	OTHER	UNMOD UC	UNMOD LIC	PC OH	PC PF	BUR LIC	COST SOURCE CITATION	COMMENTS
P9	Debris Removal and Disposal	264.7	AC	1.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$13,083.75	\$13,083.75	\$3,462,958.65	0%	0%	\$3,462,959	P Previous Work	Developed by Anchor QEA (2010)
												TOTAL UNIT COST:		\$3,462,959			

QTY	Quantity	ACR	Acres
EQUIP	Equipment	BCY	Bank Cubic Yard
MATL	Material	CLF	100 Linear Foot
HPF	HTRW Productivity Factor	DY	Days
ADJ LABOR	Adjusted Labor for HFP	EA	Each
ADJ EQUIP	Adjusted Equipment for HFP	LF	Linear Foot
UNMOD UC	Unmodified Unit Cost	HR	Hours
UNMOD LIC	Unmodified Line Item Cost	LB	Pounds
UNBUR LIC	Unburdened Line Item Cost	LCY	Loose Cubic Yard
PC OH	Prime Contractor Overhead	LS	Lump Sum
PC PF	Prime Contractor Profit	RL	Roll
BUR LIC	Burdened Line Item Cost	SY	Square Yard
		TN	Tons

es.

with mandated costs such as per diem do not have overhead and profit applied.

terms.

% and profit is 0% for quotes for all other material vendor quotes.

FACTORY:	Field work will be in Level "D" PPE.	PC OH	Prime Contractor Overhead	LS	Lump Sum
H&S Productivity (labor and equipment only)	MII assembly costs include HPF adjustments.	PC PF	Prime Contractor Profit	RL	Roll
Escalation to Base Year	2015 cost sources are not escalated (EF=1.00). All other costs are escalated based on the USACE CWCCIS, EM 1110-2-1304, Mar 2015.	BUR LIC	Burdened Line Item Cost	SY	Square Yards
Area Cost Factor	An AF of 1.05 is used for Oregon, except that an AF of 1.00 (national unmodified average) is used for MII assembly costs and local vendor quotes.			TN	Tons
Subcontractor Overhead and Profit	It is assumed that home office OH is 8% and profit is 9% for the Prime Contractor. Professional labor overhead is 100%. Allowances and items with mandated costs such as per diem do not have overhead and profit applied.				
Prime Contractor Overhead and Profit	Items previously developed by Anchor QEA (2010) already include contractor markups, therefore overhead and profit were not applied to those items. It is assumed that OH is 1% and profit is 0% for vendor quotes for treatment and disposal at offsite disposal facilities. It is assumed that OH is 5% and profit is 0% for quotes for all other material vendor quotes.				

TABLE CW-D6

<div style="display: flex; justify-content: space-between;"> <span><b>Alternative D</b></span> <span><b>Cost Worksheet: CW-D6</b></span> </div>																		
<b>Capital Cost Sub-Element</b> <b>Obstruction Removal and Relocation</b>												<b>COST WORKSHEET</b>						
<b>Site:</b> Portland Harbor Superfund Site <b>Location:</b> Portland, Oregon <b>Phase:</b> Draft Feasibility Study <b>Base Year:</b> 2015												<b>Prepared By:</b> JN  <b>Checked By:</b> AS		<b>Date:</b> 7/27/2015  <b>Date:</b> 7/28/2015				
<b>Work Statement:</b> This sub-element involves all work related to obstructions removal, relocation, and disposal. It includes all costs for labor, equipment and materials developed from previous work for pile removal and disposal, pile replacement, and temporary dock relocation.																		
<b>Cost Analysis:</b> Cost for Obstructions (Lump Sum)																		
COST DATABASE CODE	DESCRIPTION	QTY	UNIT(S)	HPF	LABOR	ADJ LABOR	EQUIP	ADJ EQUIP	MATL	OTHER	UNMOD UC	UNMOD LIC	PC OH	PC PF	BUR LIC	COST SOURCE CITATION	COMMENTS	
P10	Pile Removal and Disposal	810	EA	1.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$714.38	\$714.38	\$578,643.75	0%	0%	\$578,644	P Previous Work	Developed by Anchor QEA (2010)	
P11	Pile Replacement	810	EA	1.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$7,465.50	\$7,465.50	\$6,047,055.00	0%	0%	\$6,047,055	P Previous Work	Developed by Anchor QEA (2010)	
P12	Temporary Dock Relocation	9	EA	1.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$100,319.63	\$100,319.63	\$902,876.63	0%	0%	\$902,877	P Previous Work	Developed by Anchor QEA (2010)	
<b>TOTAL UNIT COST:</b>															\$7,528,576			
<div style="display: flex; justify-content: space-between;"> <div style="width: 60%;"> <b>Notes:</b>            HTRW productivity factor is from Exhibit B-3 or B-4 of "A Guide to Developing and Documenting Cost Estimates During the Feasibility Study", EPA 2000            The Cost Database Code is a reference code for linking with line item cost information with the cost source database and is not otherwise used within these cost worksheets.   <b>Source of Cost Data:</b>            NA Not Applicable - costs are from previous work or vendor quote            For citation references, the following sources apply:            MII (MII Assemblies), GSA (www.gsa.gov), FLC (www.flcdatcenter.com), A (Allowance), V (Vendor Quote), CW (Means CostWorks 2015), P (Previous Work), and FRTR (www.frtr.gov)         </div> <div style="width: 35%;"> <b>Abbreviations:</b>            QTY Quantity            EQUIP Equipment            MATL Material            HPF HTRW Productivity Factor            ADJ LABOR Adjusted Labor for HFP            ADJ EQUIP Adjusted Equipment for HFP            UNMOD UC Unmodified Unit Cost            UNMOD LIC Unmodified Line Item Cost            UNBUR LIC Unburdened Line Item Cost            PC OH Prime Contractor Overhead            PC PF Prime Contractor Profit            BUR LIC Burdened Line Item Cost             ACR Acres            BCY Bank Cubic Yard            CLF 100 Linear Foot            DY Days            EA Each            LF Linear Foot            HR Hours            LB Pounds            LCY Loose Cubic Yard            LS Lump Sum            RL Roll            SY Square Yard            TN Tons         </div> </div>																		
<div style="display: flex; justify-content: space-between;"> <div style="width: 45%;"> <b>Cost Adjustment Checklist:</b>            FACTOR:            H&amp;S Productivity (labor and equipment only)            Escalation to Base Year            Area Cost Factor            Subcontractor Overhead and Profit            Prime Contractor Overhead and Profit         </div> <div style="width: 50%;"> <b>NOTES:</b>            Field work will be in Level "D" PPE.            MII assembly costs include HPF adjustments.            2015 cost sources are not escalated (EF=1.00). All other costs are escalated based on the USACE CWCCIS, EM 1110-2-1304, Mar 2015.            An AF of 1.05 is used for Oregon, except that an AF of 1.00 (national unmodified average) is used for MII assembly costs and local vendor quotes.            It is assumed that home office OH is 8% and profit is 9% for the Prime Contractor. Professional labor overhead is 100%. Allowances and items with mandated costs such as per diem do not have overhead and profit applied.            Items previously developed by Anchor QEA (2010) already include contractor markups, therefore overhead and profit were not applied to those items.            It is assumed that OH is 1% and profit is 0% for vendor quotes for treatment and disposal at offsite disposal facilities. It is assumed that OH is 5% and profit is 0% for quotes for all other material vendor quotes.         </div> </div>																		



TABLE CW-D7

TABLE CW-D7																		
Alternative D		Cost Worksheet: CW-D7		COST WORKSHEET														
Capital Cost Sub-Element																		
Erosion/Residual Control Measures																		
<b>Site:</b>	Portland Harbor Superfund Site										<b>Prepared By:</b> JN	Date: 7/27/2015						
<b>Location:</b>	Portland, Oregon										<b>Checked By:</b> AS	Date: 7/28/2015						
<b>Phase:</b>	Draft Feasibility Study																	
<b>Base Year:</b>	2015																	
<b>Work Statement:</b> This sub-element involves the installation, maintenance, and removal of silt curtains and sheet pile walls for erosion and residual control. It includes costs for on-site labor, equipment, and materials developed from previous work.																		
<b>Cost Analysis:</b> Cost for Erosion/Residual Control Measures (Lump Sum)																		
COST DATABASE CODE	DESCRIPTION	QTY	UNIT(S)	HPF	LABOR	ADJ LABOR	EQUIP	ADJ EQUIP	MATL	OTHER	UNMOD UC	UNMOD LIC	PC OH	PC PF	BUR LIC	COST SOURCE CITATION	COMMENTS	
P13	Purchase, Install and Maintain Silt Curtains	30,000	LF	1.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$96.75	\$96.75	\$2,902,500.00	0%	0%	\$2,902,500	P Previous Work	Developed by Anchor QEA (2010)	
P14	Purchase, Install and Remove Sheet Pile Walls	7,500	LF	1.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$2,745.00	\$2,745.00	\$20,587,500.00	0%	0%	\$20,587,500	P Previous Work	Developed by Anchor QEA (2010)	
TOTAL UNIT COST:															\$23,490,000			
<div style="display: flex; justify-content: space-between;"> <div style="width: 60%;"> <b>Notes:</b>            HTRW productivity factor is from Exhibit B-3 or B-4 of "A Guide to Developing and Documenting Cost Estimates During the Feasibility Study", EPA 2000            The Cost Database Code is a reference code for linking with line item cost information with the cost source database and is not otherwise used within these cost worksheets.         </div> <div style="width: 35%;"> <b>Abbreviations:</b>            QTY Quantity            EQUIP Equipment            MATL Material            HPF HTRW Productivity Factor            ADJ LABOR Adjusted Labor for HFP            ADJ EQUIP Adjusted Equipment for HFP            UNMOD UC Unmodified Unit Cost            UNMOD LIC Unmodified Line Item Cost            UNBUR LIC Unburdened Line Item Cost            PC OH Prime Contractor Overhead            PC PF Prime Contractor Profit            BUR LIC Burdened Line Item Cost         </div> <div style="width: 40%;">           ACR Acres            BCY Bank Cubic Yard            CLF 100 Linear Foot            DY Days            EA Each            LF Linear Foot            HR Hours            LB Pounds            LCY Loose Cubic Yard            LS Lump Sum            RL Roll            SY Square Yard            TN Tons         </div> </div>																		
<b>Source of Cost Data:</b> NA Not Applicable - costs are from previous work or vendor quote For citation references, the following sources apply: MII (MII Assemblies), GSA (www.gsa.gov), FLC (www.flcdatcenter.com), A (Allowance), V (Vendor Quote), CW (Means CostWorks 2015), P (Previous Work), and FRTR (www.frtr.gov)																		
<div style="display: flex; justify-content: space-between;"> <div style="width: 45%;"> <b>Cost Adjustment Checklist:</b>            FACTOR:            H&amp;S Productivity (labor and equipment only)            Escalation to Base Year            Area Cost Factor            Subcontractor Overhead and Profit            Prime Contractor Overhead and Profit         </div> <div style="width: 50%;"> <b>NOTES:</b>            Field work will be in Level "D" PPE.            MII assembly costs include HPF adjustments.            2015 cost sources are not escalated (EF=1.00). All other costs are escalated based on the USACE CWCCIS, EM 1110-2-1304, Mar 2015.            An AF of 1.05 is used for Oregon, except that an AF of 1.00 (national unmodified average) is used for MII assembly costs and local vendor quotes.            It is assumed that home office OH is 8% and profit is 9% for the Prime Contractor. Professional labor overhead is 100%. Allowances and items with mandated costs such as per diem do not have overhead and profit applied.            Items previously developed by Anchor QEA (2010) already include contractor markups, therefore overhead and profit were not applied to those items.            It is assumed that OH is 1% and profit is 0% for vendor quotes for treatment and disposal at offsite disposal facilities. It is assumed that OH is 5% and profit is 0% for quotes for all other material vendor quotes.         </div> </div>																		

TABLE CW-D8

Alternative D

Cost Worksheet: CW-D8

Capital Cost Sub-Element

Dredging of Contaminated Sediments (Open Water)

Site: Portland Harbor Superfund Site

Location: Portland, Oregon

Phase: Draft Feasibility Study

Base Year: 2015

Prepared By: JN

Checked By: AS

Date: 7/27/2015

Date: 7/28/2015

Work Statement:

This sub-element involves mechanical dredging of contaminated sediments in open water areas and transport to offloading area. It includes costs for on-site labor, equipment, and materials developed from previous work.

Cost Analysis:

Cost for Open Water Dredging (Lump Sum)

COST DATABASE CODE	DESCRIPTION	QTY	UNIT(S)	HPF	LABOR	ADJ LABOR	EQUIP	ADJ EQUIP	MATL	OTHER	UNMOD UC	UNMOD LIC	PC OH	PC PF	BUR LIC	COST SOURCE CITATION	COMMENTS
P15	Open Water Dredging and Transport	1,137,009	CY	1.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$38.03	\$38.03	\$43,234,767.23	0%	0%	\$43,234,767	P Previous Work	Developed by Anchor QEA (2010)
TOTAL UNIT COST:															\$43,234,767		

Notes:

HTRW productivity factor is from Exhibit B-3 or B-4 of "A Guide to Developing and Documenting Cost Estimates During the Feasibility Study", EPA 2000

The Cost Database Code is a reference code for linking with line item cost information with the cost source database and is not otherwise used within these cost worksheets.

Source of Cost Data:

NA Not Applicable - costs are from previous work or vendor quote

For citation references, the following sources apply:

MII (MII Assemblies), GSA (www.gsa.gov), FLC (www.flcdatabase.com), A (Allowance), V (Vendor Quote), CW (Means CostWorks 2015), P (Previous Work), and FRTR (www.frtr.gov)

Cost Adjustment Checklist:

FACTOR: Field work will be in Level "D" PPE.

H&S Productivity (labor and equipment only) MII assembly costs include HPF adjustments.

Escalation to Base Year 2015 cost sources are not escalated (EF=1.00). All other costs are escalated based on the USACE CWCCIS, EM 1110-2-1304, Mar 2015.

Area Cost Factor An AF of 1.05 is used for Oregon, except that an AF of 1.00 (national unmodified average) is used for MII assembly costs and local vendor quotes.

Subcontractor Overhead and Profit It is assumed that home office OH is 8% and profit is 9% for the Prime Contractor. Professional labor overhead is 100%. Allowances and items with mandated costs such as per diem do not have overhead and profit applied.

Prime Contractor Overhead and Profit Items previously developed by Anchor QEA (2010) already include contractor markups, therefore overhead and profit were not applied to those items.

It is assumed that OH is 1% and profit is 0% for vendor quotes for treatment and disposal at offsite disposal facilities. It is assumed that OH is 5% and profit is 0% for quotes for all other material vendor quotes.

Abbreviations:

QTY Quantity

EQUIP Equipment

MATL Material

HPF HTRW Productivity Factor

ADJ LABOR Adjusted Labor for HFP

ADJ EQUIP Adjusted Equipment for HFP

UNMOD UC Unmodified Unit Cost

UNMOD LIC Unmodified Line Item Cost

UNBUR LIC Unburdened Line Item Cost

PC OH Prime Contractor Overhead

PC PF Prime Contractor Profit

BUR LIC Burdened Line Item Cost

ACR Acres

BCY Bank Cubic Yard

CLF 100 Linear Foot

DY Days

EA Each

LF Linear Foot

HR Hours

LB Pounds

LCY Loose Cubic Yard

LS Lump Sum

RL Roll

SY Square Yard

TN Tons

TABLE CW-D9

Alternative D

Cost Worksheet: CW-D9

Capital Cost Sub-Element

Dredging of Contaminated Sediments (Confined)

Site: Portland Harbor Superfund Site

Location: Portland, Oregon

Phase: Draft Feasibility Study

Base Year: 2015

Prepared By: JN

Checked By: AS

Date: 7/27/2015

Date: 7/28/2015

Work Statement:

This sub-element involves mechanical dredging of contaminated sediments in confined areas and transport to offloading area. It includes costs for on-site labor, equipment, and materials developed from previous work.

Cost Analysis:

Cost for Confined Dredging (Lump Sum)

COST DATABASE CODE	DESCRIPTION	QTY	UNIT(S)	HPF	LABOR	ADJ LABOR	EQUIP	ADJ EQUIP	MATL	OTHER	UNMOD UC	UNMOD LIC	PC OH	PC PF	BUR LIC	COST SOURCE CITATION	COMMENTS
P16	Confined Dredging and Transport	231,402	CY	1.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$53.66	\$53.66	\$12,417,609.83	0%	0%	\$12,417,610	P Previous Work	Developed by Anchor QEA (2010)
TOTAL UNIT COST:															\$12,417,610		

Notes:

HTRW productivity factor is from Exhibit B-3 or B-4 of "A Guide to Developing and Documenting Cost Estimates During the Feasibility Study", EPA 2000

The Cost Database Code is a reference code for linking with line item cost information with the cost source database and is not otherwise used within these cost worksheets.

Source of Cost Data:

NA Not Applicable - costs are from previous work or vendor quote

For citation references, the following sources apply:

MII (MII Assemblies), GSA (www.gsa.gov), FLC (www.flcdatabase.com), A (Allowance), V (Vendor Quote), CW (Means CostWorks 2015), P (Previous Work), and FRTR (www.frtr.gov)

Cost Adjustment Checklist:

FACTOR: Field work will be in Level "D" PPE.

H&S Productivity (labor and equipment only) MII assembly costs include HPF adjustments.

Escalation to Base Year 2015 cost sources are not escalated (EF=1.00). All other costs are escalated based on the USACE CWCCIS, EM 1110-2-1304, Mar 2015.

Area Cost Factor An AF of 1.05 is used for Oregon, except that an AF of 1.00 (national unmodified average) is used for MII assembly costs and local vendor quotes.

Subcontractor Overhead and Profit It is assumed that home office OH is 8% and profit is 9% for the Prime Contractor. Professional labor overhead is 100%. Allowances and items with mandated costs such as per diem do not have overhead and profit applied.

Prime Contractor Overhead and Profit Items previously developed by Anchor QEA (2010) already include contractor markups, therefore overhead and profit were not applied to those items.

It is assumed that OH is 1% and profit is 0% for vendor quotes for treatment and disposal at offsite disposal facilities. It is assumed that OH is 5% and profit is 0% for quotes for all other material vendor quotes.

Abbreviations:

QTY Quantity

EQUIP Equipment

MATL Material

HPF HTRW Productivity Factor

ADJ LABOR Adjusted Labor for HFP

ADJ EQUIP Adjusted Equipment for HFP

UNMOD UC Unmodified Unit Cost

UNMOD LIC Unmodified Line Item Cost

UNBUR LIC Unburdened Line Item Cost

PC OH Prime Contractor Overhead

PC PF Prime Contractor Profit

BUR LIC Burdened Line Item Cost

ACR Acres

BCY Bank Cubic Yard

CLF 100 Linear Foot

DY Days

EA Each

LF Linear Foot

HR Hours

LB Pounds

LCY Loose Cubic Yard

LS Lump Sum

RL Roll

SY Square Yard

TN Tons

TABLE CW-D10

Alternative D Cost Worksheet: CW-D10

## Capital Cost Sub-Element

## Excavation of Contaminated Sediments (From Shore for Riverbanks)

## COST WORKSHEET

Site: Portland Harbor Superfund Site Prepared By: JN Date: 7/27/2015  
 Location: Portland, Oregon  
 Phase: Draft Feasibility Study Checked By: AS Date: 7/28/2015  
 Base Year: 2015

## Work Statement:

This sub-element involves mechanical excavation from the shore of contaminated materials along the riverbanks. It includes costs for on-site labor, equipment, and materials developed from previous work.

## Cost Analysis:

Cost for Excavation from Shore for Riverbanks (Lump Sum)

COST DATABASE CODE	DESCRIPTION	QTY	UNIT(S)	HPF	LABOR	ADJ LABOR	EQUIP	ADJ EQUIP	MATL	OTHER	UNMOD UC	UNMOD LIC	PC OH	PC PF	BUR LIC	COST SOURCE CITATION	COMMENTS
P17	Dredging from Shore	72,643	CY	1.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$46.80	\$46.80	\$3,399,692.40	0%	0%	\$3,399,692	P Previous Work	Developed by Anchor QEA (2010)
TOTAL UNIT COST:															\$3,399,692		

## Notes:

HTRW productivity factor is from Exhibit B-3 or B-4 of "A Guide to Developing and Documenting Cost Estimates During the Feasibility Study", EPA 2000  
 The Cost Database Code is a reference code for linking with line item cost information with the cost source database and is not otherwise used within these cost worksheets.

## Source of Cost Data:

NA Not Applicable - costs are from previous work or vendor quote

For citation references, the following sources apply:

MII (MII Assemblies), GSA (www.gsa.gov), FLC (www.flcdatcenter.com), A (Allowance), V (Vendor Quote), CW (Means CostWorks 2015), P (Previous Work), and FRTR (www.frtr.gov)

## Cost Adjustment Checklist:

FACTOR:  
 H&S Productivity (labor and equipment only)  
 Escalation to Base Year  
 Area Cost Factor  
 Subcontractor Overhead and Profit  
 Prime Contractor Overhead and Profit

## NOTES:

Field work will be in Level "D" PPE.

MII assembly costs include HPF adjustments.

2015 cost sources are not escalated (EF=1.00). All other costs are escalated based on the USACE CWCCIS, EM 1110-2-1304, Mar 2015.

An AF of 1.05 is used for Oregon, except that an AF of 1.00 (national unmodified average) is used for MII assembly costs and local vendor quotes.

It is assumed that home office OH is 8% and profit is 9% for the Prime Contractor. Professional labor overhead is 100%. Allowances and items with mandated costs such as per diem do not have overhead and profit applied.

Items previously developed by Anchor QEA (2010) already include contractor markups, therefore overhead and profit were not applied to those items.

It is assumed that OH is 1% and profit is 0% for vendor quotes for treatment and disposal at offsite disposal facilities. It is assumed that OH is 5% and profit is 0% for quotes for all other material vendor quotes.

## Abbreviations:

QTY	Quantity	ACR	Acres
EQUIP	Equipment	BCY	Bank Cubic Yard
MATL	Material	CLF	100 Linear Foot
HPF	HTRW Productivity Factor	DY	Days
ADJ LABOR	Adjusted Labor for HFP	EA	Each
ADJ EQUIP	Adjusted Equipment for HFP	LF	Linear Foot
UNMOD UC	Unmodified Unit Cost	HR	Hours
UNMOD LIC	Unmodified Line Item Cost	LB	Pounds
UNBUR LIC	Unburdened Line Item Cost	LCY	Loose Cubic Yard
PC OH	Prime Contractor Overhead	LS	Lump Sum
PC PF	Prime Contractor Profit	RL	Roll
BUR LIC	Burdened Line Item Cost	SY	Square Yard
		TN	Tons

TABLE CW-D11

Alternative D Cost Worksheet: CW-D11

## Capital Cost Sub-Element

## Hydraulic Offloading of the Contaminated Sediments

## COST WORKSHEET

Site: Portland Harbor Superfund Site  
 Location: Portland, Oregon  
 Phase: Draft Feasibility Study  
 Base Year: 2015

Prepared By: JN Date: 7/27/2015

Checked By: AS Date: 7/28/2015

## Work Statement:

This sub-element involves the hydraulic offloading of contaminated sediments. The contaminated sediments would be offloaded at the transload facility (for Subtitle C or Subtitle D disposal). It includes costs for on-site labor, equipment, and materials developed from previous work.

## Cost Analysis:

Cost for Hydraulic Offloading (Lump Sum)

COST DATABASE CODE	DESCRIPTION	QTY	UNIT(S)	HPF	LABOR	ADJ LABOR	EQUIP	ADJ EQUIP	MATL	OTHER	UNMOD UC	UNMOD LIC	PC OH	PC PF	BUR LIC	COST SOURCE CITATION	COMMENTS
	Hydraulic Offloading for Subtitle C Disposal																
P19	Hydraulic Offloading	355,633	CY	1.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$6.30	\$6.30	\$2,240,487.90	0%	0%	\$2,240,488	P Previous Work	Developed by Anchor QEA (2010)
	Hydraulic Offloading for Subtitle D Disposal																
P19	Hydraulic Offloading	1,085,421	CY	1.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$6.30	\$6.30	\$6,838,152.30	0%	0%	\$6,838,152	P Previous Work	Developed by Anchor QEA (2010)
TOTAL UNIT COST:															\$9,078,640		

## Notes:

HTRW productivity factor is from Exhibit B-3 or B-4 of "A Guide to Developing and Documenting Cost Estimates During the Feasibility Study", EPA 2000

The Cost Database Code is a reference code for linking with line item cost information with the cost source database and is not otherwise used within these cost worksheets.

## Source of Cost Data:

NA Not Applicable - costs are from previous work or vendor quote

For citation references, the following sources apply:

MII (MII Assemblies), GSA (www.gsa.gov), FLC (www.flcdatacenter.com), A (Allowance), V (Vendor Quote), CW (Means CostWorks 2015), P (Previous Work), and FRTR (www.frtr.gov)

## Cost Adjustment Checklist:

FACTOR:  
 H&S Productivity (labor and equipment only)  
 Escalation to Base Year  
 Area Cost Factor  
 Subcontractor Overhead and Profit  
 Prime Contractor Overhead and Profit

## NOTES:

Field work will be in Level "D" PPE.

MI assembly costs include HPF adjustments.

2015 cost sources are not escalated (EF=1.00). All other costs are escalated based on the USACE CWCCIS, EM 1110-2-1304, Mar 2015.

An AF of 1.05 is used for Oregon, except that an AF of 1.00 (national unmodified average) is used for MII assembly costs and local vendor quotes.

It is assumed that home office OH is 8% and profit is 9% for the Prime Contractor. Professional labor overhead is 100%. Allowances and items with mandated costs such as per diem do not have overhead and profit applied.

Items previously developed by Anchor QEA (2010) already include contractor markups, therefore overhead and profit were not applied to those items.

It is assumed that OH is 1% and profit is 0% for vendor quotes for treatment and disposal at offsite disposal facilities. It is assumed that OH is 5% and profit is 0% for quotes for all other material vendor quotes.

## Abbreviations:

QTY	Quantity	ACR	Acres
EQUIP	Equipment	BCY	Bank Cubic Yard
MATL	Material	CLF	100 Linear Foot
HPF	HTRW Productivity Factor	DY	Days
ADJ LABOR	Adjusted Labor for HFP	EA	Each
ADJ EQUIP	Adjusted Equipment for HFP	LF	Linear Foot
UNMOD UC	Unmodified Unit Cost	HR	Hours
UNMOD LIC	Unmodified Line Item Cost	LB	Pounds
UNBUR LIC	Unburdened Line Item Cost	LCY	Loose Cubic Yard
PC OH	Prime Contractor Overhead	LS	Lump Sum
PC PF	Prime Contractor Profit	RL	Roll
BUR LIC	Burdened Line Item Cost	SY	Square Yard
		TN	Tons

TABLE CW-D12

TABLE CW-D12																	
<div style="display: flex; justify-content: space-between;"> <div> <b>Alternative D</b>  <b>Capital Cost Sub-Element</b>  <b>Subtitle C/TSCA Disposal (Handling, Transportation, Treatment of Select PTW Materials, and Disposal)</b> </div> <div> <b>Cost Worksheet: CW-D12</b> </div> <div> <b>COST WORKSHEET</b> </div> </div>																	
<b>Site:</b> Portland Harbor Superfund Site <b>Location:</b> Portland, Oregon <b>Phase:</b> Draft Feasibility Study <b>Base Year:</b> 2015										<b>Prepared By:</b> AB <b>Checked By:</b> JN				<b>Date:</b> 8/11/2015 <b>Date:</b> 8/12/2015			
<b>Work Statement:</b> This sub-element involves the disposal of contaminated sediments at a Subtitle C/TSCA landfill, including materials handling from the barge to truck, transportation of the sediments to the Subtitle C/TSCA landfill, and disposal of contaminated sediments (including treatment for a portion of the PTW volume that is NRC/NAPL). It includes costs for on-site labor, equipment, and materials developed from previous work, as well as recent vendor quotes.																	
<b>Cost Analysis:</b> Cost for Subtitle C/TSCA Disposal (Lump Sum)																	
COST DATABASE CODE	DESCRIPTION	QTY	UNIT(S)	HPF	LABOR	ADJ LABOR	EQUIP	ADJ EQUIP	MATL	OTHER	UNMOD UC	UNMOD LIC	PC OH	PC PF	BUR LIC	COST SOURCE CITATION	COMMENTS
	<b>Materials Handling</b>																
P20	Materials Handling from Barge to Upland Stockpile	355,633	CY	1.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$10.46	\$10.46	\$3,720,810.26	0%	0%	\$3,720,810	P Previous Work	Developed by Anchor QEA (2010)
P21	Mix DE with Dredged Material to Improve Handling	82,685	TON	1.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$2.25	\$2.25	\$186,041.25	0%	0%	\$186,041	P Previous Work	Developed by Anchor QEA (2010)
M7	Diatomaceous Earth	82,685	TON	1.00	\$0.00	\$0.00	\$0.00	\$0.00	\$105.75	\$0.00	\$105.75	\$8,743,938.75	0%	0%	\$8,743,939	P Previous Work	Vendor Quote - Waste Management, 2010. Assumes 15% mixing rate.
P22	Materials Handling from Stockpile to Truck/Rail Car	355,633	CY	1.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$8.72	\$8.72	\$3,100,675.22	0%	0%	\$3,100,675	P Previous Work	Developed by Anchor QEA (2010)
	<b>Transportation and Disposal at Subtitle C/TSCA Landfill</b>																
M8	Transportation to Subtitle C/TSCA Landfill	355,633	CY	1.00	\$0.00	\$0.00	\$0.00	\$0.00	\$69.75	\$0.00	\$69.75	\$24,805,401.75	8%	9%	\$29,200,919	V Vendor Quote	Assumes truck transportation. Quote - CWM of the Northwest.
M20	Thermal Desorption Treatment at Subtitle C/TSCA Landfill (Low End of Treatment Cost Range)	177,817	CY	1.00	\$0.00	\$0.00	\$0.00	\$0.00	\$489.00	\$0.00	\$489.00	\$86,952,513.00	1%	0%	\$87,822,038	V Vendor Quote	Quote - CWM of the Northwest
M9	Thermal Desorption Treatment at Subtitle C/TSCA Landfill (High End of Treatment Cost Range)	177,816	CY	1.00	\$0.00	\$0.00	\$0.00	\$0.00	\$875.75	\$0.00	\$875.75	\$155,722,362.00	1%	0%	\$157,279,586	V Vendor Quote	Quote - CWM of the Northwest.
M10	Tipping Fee at Subtitle C/TSCA Landfill	355,633	CY	1.00	\$0.00	\$0.00	\$0.00	\$0.00	\$131.75	\$0.00	\$131.75	\$46,854,647.75	1%	0%	\$47,323,194	V Vendor Quote	Quote - CWM of the Northwest.
<b>TOTAL UNIT COST:</b>														\$337,377,202			
<b>Notes:</b> HTRW productivity factor is from Exhibit B-3 or B-4 of "A Guide to Developing and Documenting Cost Estimates During the Feasibility Study", EPA 2000 The Cost Database Code is a reference code for linking with line item cost information with the cost source database and is not otherwise used within these cost worksheets.																	
<b>Source of Cost Data:</b> NA Not Applicable - costs are from previous work or vendor quote For citation references, the following sources apply: MII (MII Assemblies), GSA (www.gsa.gov), FLC (www.flcdatabase.com), A (Allowance), V (Vendor Quote), CW (Means CostWorks 2015), P (Previous Work), and FRTR (www.frtr.gov)																	
<b>Cost Adjustment Checklist:</b> FACTOR: Field work will be in Level "D" PPE. H&S Productivity (labor and equipment only) MII assembly costs include HPF adjustments. Escalation to Base Year 2015 cost sources are not escalated (EF=1.00). All other costs are escalated based on the USACE CWCCIS, EM 1110-2-1304, Mar 2015. Area Cost Factor An AF of 1.05 is used for Oregon, except that an AF of 1.00 (national unmodified average) is used for MII assembly costs and local vendor quotes. Subcontractor Overhead and Profit It is assumed that home office OH is 8% and profit is 9% for the Prime Contractor. Professional labor overhead is 100%. Allowances and items with mandated costs such as per diem do not have overhead and profit applied. Prime Contractor Overhead and Profit Items previously developed by Anchor QEA (2010) already include contractor markups, therefore overhead and profit were not applied to those items. It is assumed that OH is 1% and profit is 0% for vendor quotes for treatment and disposal at offsite disposal facilities. It is assumed that OH is 5% and profit is 0% for quotes for all other material vendor quotes.																	
<b>Abbreviations:</b> <div style="display: flex; justify-content: space-between;"> <div>           QTY Quantity            EQUIP Equipment            MATL Material            HPF HTRW Productivity Factor            ADJ LABOR Adjusted Labor for HFP            ADJ EQUIP Adjusted Equipment for HFP            UNMOD UC Unmodified Unit Cost            UNMOD LIC Unmodified Line Item Cost            UNBUR LIC Unburdened Line Item Cost            PC OH Prime Contractor Overhead            PC PF Prime Contractor Profit            BUR LIC Burdened Line Item Cost         </div> <div>           ACR Acres            BCY Bank Cubic Yard            CLF 100 Linear Foot            DY Days            EA Each            LF Linear Foot            HR Hours            LB Pounds            LCY Loose Cubic Yard            LS Lump Sum            RL Roll            SY Square Yard            TN Tons         </div> </div>																	

TABLE CW-D13

Alternative D Cost Worksheet: CW-D13

## Capital Cost Sub-Element

## Subtitle D Disposal (Handling, Transportation, and Disposal)

## COST WORKSHEET

**Site:** Portland Harbor Superfund Site  
**Location:** Portland, Oregon  
**Phase:** Draft Feasibility Study  
**Base Year:** 2015

Prepared By: AB Date: 8/11/2015

Checked By: JN Date: 8/12/2015

**Work Statement:**

This sub-element involves the disposal of contaminated sediments at a Subtitle D landfill, including materials handling from the barge to truck, transportation of the sediments to the Subtitle D landfill, and disposal of contaminated sediments. It includes costs for on-site labor, equipment, and materials developed from previous work, as well as recent vendor quotes.

**Cost Analysis:**

Cost for Subtitle D Disposal (Lump Sum)

COST DATABASE CODE	DESCRIPTION	QTY	UNIT(S)	HPF	LABOR	ADJ LABOR	EQUIP	ADJ EQUIP	MATL	OTHER	UNMOD UC	UNMOD LIC	PC OH	PC PF	BUR LIC	COST SOURCE CITATION	COMMENTS
	Materials Handling																
P20	Materials Handling from Barge to Upland Stockpile	1,085,421	CY	1.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$10.46	\$10.46	\$11,356,217.21	0%	0%	\$11,356,217	P Previous Work	Developed by Anchor QEA (2010)
P21	Mix DE with Dredged Material to Improve Handling	84,121	TON	1.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$2.25	\$2.25	\$189,272.25	0%	0%	\$189,272	P Previous Work	Developed by Anchor QEA (2010)
M7	Diatomaceous Earth	84,121	TON	1.00	\$0.00	\$0.00	\$0.00	\$0.00	\$105.75	\$0.00	\$105.75	\$8,895,795.75	0%	0%	\$8,895,796	P Previous Work	Vendor Quote - Waste Management, 2010. Assumes 5% mixing rate.
P22	Materials Handling from Stockpile to Truck/Rail Car	1,085,421	CY	1.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$8.72	\$8.72	\$9,463,514.34	0%	0%	\$9,463,514	P Previous Work	Developed by Anchor QEA (2010)
P37	Gondola/Rail Car Mobilization	2,500	EA	1.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$4,500.00	\$4,500.00	\$11,250,000.00	0%	0%	\$11,250,000	P Previous Work	Developed by Anchor QEA (2010)
	Transportation and Disposal at Subtitle D Landfill																
M11	Transportation and Disposal at Subtitle D Landfill	1,085,421	CY	1.00	\$0.00	\$0.00	\$0.00	\$0.00	\$90.68	\$0.00	\$90.68	\$98,425,976.28	1%	0%	\$99,410,236	P Previous Work	Quote - Republic Services (Roosevelt Landfill). Assumes rail transportation to disposal facility.
<b>TOTAL UNIT COST:</b>															\$140,565,035		

**Notes:**

HTRW productivity factor is from Exhibit B-3 or B-4 of "A Guide to Developing and Documenting Cost Estimates During the Feasibility Study", EPA 2000

The Cost Database Code is a reference code for linking with line item cost information with the cost source database and is not otherwise used within these cost worksheets.

**Source of Cost Data:**

NA Not Applicable - costs are from previous work or vendor quote

For citation references, the following sources apply:

MII (MII Assemblies), GSA (www.gsa.gov), FLC (www.flcdatcenter.com), A (Allowance), V (Vendor Quote), CW (Means CostWorks 2015), P (Previous Work), and FRTR (www.frtr.gov)

**Cost Adjustment Checklist:**

FACTOR:

H&amp;S Productivity (labor and equipment only)

Escalation to Base Year

Area Cost Factor

Subcontractor Overhead and Profit

Prime Contractor Overhead and Profit

**NOTES:**

Field work will be in Level "D" PPE.

MII assembly costs include HPF adjustments.

2015 cost sources are not escalated (EF=1.00). All other costs are escalated based on the USACE CWCCIS, EM 1110-2-1304, Mar 2015.

An AF of 1.05 is used for Oregon, except that an AF of 1.00 (national unmodified average) is used for MII assembly costs and local vendor quotes.

It is assumed that home office OH is 8% and profit is 9% for the Prime Contractor. Professional labor overhead is 100%. Allowances and items with mandated costs such as per diem do not have overhead and profit applied.

Items previously developed by Anchor QEA (2010) already include contractor markups, therefore overhead and profit were not applied to those items.

It is assumed that OH is 1% and profit is 0% for vendor quotes for treatment and disposal at offsite disposal facilities. It is assumed that OH is 5% and profit is 0% for quotes for all other material vendor quotes.

**Abbreviations:**

QTY	Quantity	ACR	Acres
EQUIP	Equipment	BCY	Bank Cubic Yard
MATL	Material	CLF	100 Linear Foot
HPF	HTRW Productivity Factor	DY	Days
ADJ LABOR	Adjusted Labor for HFP	EA	Each
ADJ EQUIP	Adjusted Equipment for HFP	LF	Linear Foot
UNMOD UC	Unmodified Unit Cost	HR	Hours
UNMOD LIC	Unmodified Line Item Cost	LB	Pounds
UNBUR LIC	Unburdened Line Item Cost	LCY	Loose Cubic Yard
PC OH	Prime Contractor Overhead	LS	Lump Sum
PC PF	Prime Contractor Profit	RL	Roll
BUR LIC	Burdened Line Item Cost	SY	Square Yard
		TN	Tons

TABLE CW-D14

<div style="display: flex; justify-content: space-between;"> <span><b>Alternative D</b></span> <span><b>Cost Worksheet: CW-D14</b></span> </div> <div style="display: flex; justify-content: space-between; margin-top: 5px;"> <span><b>Capital Cost Sub-Element Mitigation</b></span> <span style="font-size: 1.2em; font-weight: bold;">COST WORKSHEET</span> </div>																			
<b>Site:</b> Portland Harbor Superfund Site <b>Location:</b> Portland, Oregon <b>Phase:</b> Draft Feasibility Study <b>Base Year:</b> 2015												<b>Prepared By:</b> AB  <b>Checked By:</b> JN		<b>Date:</b> 8/11/2015  <b>Date:</b> 8/12/2015					
<b>Work Statement:</b> This sub-element involves mitigation of shallow water and riverbank areas. It includes costs for on-site labor, equipment, and materials developed from previous work.																			
<b>Cost Analysis:</b> Cost for Mitigation (Lump Sum)																			
COST DATABASE CODE	DESCRIPTION	QTY	UNIT(S)	HPF	LABOR	ADJ LABOR	EQUIP	ADJ EQUIP	MATL	OTHER	UNMOD UC	UNMOD LIC	PC OH	PC PF	BUR LIC	COST SOURCE CITATION	COMMENTS		
P50	Mitigation	27.3	AC	1.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$2,347,130.25	\$2,347,130.25	\$64,076,655.83	0%	0%	\$64,076,656	P Previous Work	Average cost of two Lower Duwamish projects presented and referenced in Table 6.1-1 by Anchor QEA (2010).		
												TOTAL UNIT COST:							
<div style="display: flex; justify-content: space-between;"> <div style="width: 60%;"> <b>Notes:</b>            HTRW productivity factor is from Exhibit B-3 or B-4 of "A Guide to Developing and Documenting Cost Estimates During the Feasibility Study", EPA 2000            The Cost Database Code is a reference code for linking with line item cost information with the cost source database and is not otherwise used within these cost worksheets.   <b>Source of Cost Data:</b>            NA Not Applicable - costs are from previous work or vendor quote            For citation references, the following sources apply:            MII (MII Assemblies), GSA (www.gsa.gov), FLC (www.flcdatcenter.com), A (Allowance), V (Vendor Quote), CW (Means CostWorks 2015), P (Previous Work), and FRTR (www.frtr.gov)         </div> <div style="width: 35%;"> <b>Abbreviations:</b>            QTY Quantity            EQUIP Equipment            MATL Material            HPF HTRW Productivity Factor            ADJ LABOR Adjusted Labor for HFP            ADJ EQUIP Adjusted Equipment for HFP            UNMOD UC Unmodified Unit Cost            UNMOD LIC Unmodified Line Item Cost            UNBUR LIC Unburdened Line Item Cost            PC OH Prime Contractor Overhead            PC PF Prime Contractor Profit            BUR LIC Burdened Line Item Cost         </div> <div style="width: 40%;">           ACR Acres            BCY Bank Cubic Yard            CLF 100 Linear Foot            DY Days            EA Each            LF Linear Foot            HR Hours            LB Pounds            LCY Loose Cubic Yard            LS Lump Sum            RL Roll            SY Square Yard            TN Tons         </div> </div>																			
<div style="display: flex; justify-content: space-between;"> <div style="width: 45%;"> <b>Cost Adjustment Checklist:</b>            FACTOR:            H&amp;S Productivity (labor and equipment only)            Escalation to Base Year            Area Cost Factor            Subcontractor Overhead and Profit            Prime Contractor Overhead and Profit         </div> <div style="width: 50%;"> <b>NOTES:</b>            Field work will be in Level "D" PPE.            MII assembly costs include HPF adjustments.            2015 cost sources are not escalated (EF=1.00). All other costs are escalated based on the USACE CWCCIS, EM 1110-2-1304, Mar 2015.            An AF of 1.05 is used for Oregon, except that an AF of 1.00 (national unmodified average) is used for MII assembly costs and local vendor quotes.            It is assumed that home office OH is 8% and profit is 9% for the Prime Contractor. Professional labor overhead is 100%. Allowances and items with mandated costs such as per diem do not have overhead and profit applied.            Items previously developed by Anchor QEA (2010) already include contractor markups, therefore overhead and profit were not applied to those items.            It is assumed that OH is 1% and profit is 0% for vendor quotes for treatment and disposal at offsite disposal facilities. It is assumed that OH is 5% and profit is 0% for quotes for all other material vendor quotes.         </div> </div>																			



TABLE CW-D15

Alternative D Cost Worksheet: CW-D15

## Capital Cost Sub-Element

## Sand Placement for Technology Assignments

## COST WORKSHEET

Site: Portland Harbor Superfund Site

Location: Portland, Oregon

Phase: Draft Feasibility Study

Base Year: 2015

Prepared By: JN

Date: 7/27/2015

Checked By: AS

Date: 7/28/2015

## Work Statement:

This sub-element involves the placement of sand for the construction of capping areas. It includes placement of sand within confined areas as well as open water areas. It includes costs for on-site labor, equipment, and materials developed from previous work.

## Cost Analysis:

Cost for Sand Placement for Technology Assignments (Lump Sum)

COST DATABASE CODE	DESCRIPTION	QTY	UNIT(S)	HPF	LABOR	ADJ LABOR	EQUIP	ADJ EQUIP	MATL	OTHER	UNMOD UC	UNMOD LIC	PC OH	PC PF	BUR LIC	COST SOURCE CITATION	COMMENTS
	Sand Placement (Riverbanks)																
P2	Sand Placement (Confined)	42,581	LCY	1.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$49.01	\$49.01	\$2,086,681.91	0%	0%	\$2,086,682	P Previous Work	Developed by Anchor QEA (2010)
M1	Sand	42,581	LCY	1.00	\$0.00	\$0.00	\$0.00	\$0.00	\$19.71	\$0.00	\$19.71	\$839,271.51	0%	0%	\$839,272	P Previous Work	Knife River Quote #7838 (2010)
	Sand Placement (Confined)																
P2	Sand Placement (Confined)	61,546	LCY	1.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$49.01	\$49.01	\$3,016,061.73	0%	0%	\$3,016,062	P Previous Work	Developed by Anchor QEA (2010)
M1	Sand	61,546	LCY	1.00	\$0.00	\$0.00	\$0.00	\$0.00	\$19.71	\$0.00	\$19.71	\$1,213,071.66	0%	0%	\$1,213,072	P Previous Work	Knife River Quote #7838 (2010)
	Sand Placement (Open Water)																
P6	Sand Placement (Open Water)	401,129	LCY	1.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$23.76	\$23.76	\$9,530,825.04	0%	0%	\$9,530,825	P Previous Work	Developed by Anchor QEA (2010)
M1	Sand	401,129	LCY	1.00	\$0.00	\$0.00	\$0.00	\$0.00	\$19.71	\$0.00	\$19.71	\$7,906,252.59	0%	0%	\$7,906,253	P Previous Work	Knife River Quote #7838 (2010)
TOTAL UNIT COST:															\$24,592,166		

## Notes:

HTRW productivity factor is from Exhibit B-3 or B-4 of "A Guide to Developing and Documenting Cost Estimates During the Feasibility Study", EPA 2000

The Cost Database Code is a reference code for linking with line item cost information with the cost source database and is not otherwise used within these cost worksheets.

## Source of Cost Data:

NA Not Applicable - costs are from previous work or vendor quote

For citation references, the following sources apply:

MII (MII Assemblies), GSA (www.gsa.gov), FLC (www.flcdatcenter.com), A (Allowance), V (Vendor Quote), CW (Means CostWorks 2015), P (Previous Work), and FRTR (www.frtr.gov)

## Cost Adjustment Checklist:

## FACTOR:

H&S Productivity (labor and equipment only)

Escalation to Base Year

Area Cost Factor

Subcontractor Overhead and Profit

Prime Contractor Overhead and Profit

## NOTES:

Field work will be in Level "D" PPE.

III assembly costs include HPF adjustments.

2015 cost sources are not escalated (EF=1.00). All other costs are escalated based on the USACE CWCCIS, EM 1110-2-1304, Mar 2015.

An AF of 1.05 is used for Oregon, except that an AF of 1.00 (national unmodified average) is used for MII assembly costs and local vendor quotes.

It is assumed that home office OH is 8% and profit is 9% for the Prime Contractor. Professional labor overhead is 100%. Allowances and items with mandated costs such as per diem do not have overhead and profit applied.

Items previously developed by Anchor QEA (2010) already include contractor markups, therefore overhead and profit were not applied to those items.

It is assumed that OH is 1% and profit is 0% for vendor quotes for treatment and disposal at offsite disposal facilities. It is assumed that OH is 5% and profit is 0% for quotes for all other material vendor quotes.

## Abbreviations:

QTY	Quantity	ACR	Acres
EQUIP	Equipment	BCY	Bank Cubic Yard
MATL	Material	CLF	100 Linear Foot
HPF	HTRW Productivity Factor	DY	Days
ADJ LABOR	Adjusted Labor for HFP	EA	Each
ADJ EQUIP	Adjusted Equipment for HFP	LF	Linear Foot
UNMOD UC	Unmodified Unit Cost	HR	Hours
UNMOD LIC	Unmodified Line Item Cost	LB	Pounds
UNBUR LIC	Unburdened Line Item Cost	LCY	Loose Cubic Yard
PC OH	Prime Contractor Overhead	LS	Lump Sum
PC PF	Prime Contractor Profit	RL	Roll
BUR LIC	Burdened Line Item Cost	SY	Square Yard
		TN	Tons

TABLE CW-D16

Alternative D Cost Worksheet: CW-D16

## Capital Cost Sub-Element

## Beach Mix Placement for Technology Assignments

## COST WORKSHEET

Site: Portland Harbor Superfund Site

Prepared By: JN

Date: 7/27/2015

Location: Portland, Oregon

Phase: Draft Feasibility Study

Checked By: AS

Date: 7/28/2015

Base Year: 2015

## Work Statement:

This sub-element involves the placement of beach mix for the construction of capping areas. It includes placement of beach mix within confined areas as well as open water areas. It includes costs for on-site labor, equipment, and materials developed from previous work.

## Cost Analysis:

Cost for Beach Mix Placement for Technology Assignments (Lump Sum)

COST DATABASE CODE	DESCRIPTION	QTY	UNIT(S)	HPF	LABOR	ADJ LABOR	EQUIP	ADJ EQUIP	MATL	OTHER	UNMOD UC	UNMOD LIC	PC OH	PC PF	BUR LIC	COST SOURCE CITATION	COMMENTS
	Beach Mix Placement (Riverbanks)																
P5	Beach Mix Placement (Confined)	7,986	LCY	1.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$58.50	\$58.50	\$467,181.00	0%	0%	\$467,181	P Previous Work	Developed by Anchor QEA (2010)
M5	ODOT 100 Beach Mix	7,986	LCY	1.00	\$0.00	\$0.00	\$0.00	\$0.00	\$57.59	\$0.00	\$57.59	\$459,913.74	0%	0%	\$459,914	P Previous Work	Knife River Quote #7838 (2010)
	Beach Mix Placement (Confined)																
P5	Beach Mix Placement (Confined)	1,972	LCY	1.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$58.50	\$58.50	\$115,362.00	0%	0%	\$115,362	P Previous Work	Developed by Anchor QEA (2010)
M5	ODOT 100 Beach Mix	1,972	LCY	1.00	\$0.00	\$0.00	\$0.00	\$0.00	\$57.59	\$0.00	\$57.59	\$113,567.48	0%	0%	\$113,567	P Previous Work	Knife River Quote #7838 (2010)
	Beach Mix Placement (Open Water)																
P39	Beach Mix Placement (Open Water)	14,961	LCY	1.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$28.34	\$28.34	\$423,976.04	0%	0%	\$423,976	P Previous Work	Developed by Anchor QEA (2010)
M5	ODOT 100 Beach Mix	14,961	LCY	1.00	\$0.00	\$0.00	\$0.00	\$0.00	\$57.59	\$0.00	\$57.59	\$861,603.99	0%	0%	\$861,604	P Previous Work	Knife River Quote #7838 (2010)
TOTAL UNIT COST:															\$2,441,604		

## Notes:

HTRW productivity factor is from Exhibit B-3 or B-4 of "A Guide to Developing and Documenting Cost Estimates During the Feasibility Study", EPA 2000

The Cost Database Code is a reference code for linking with line item cost information with the cost source database and is not otherwise used within these cost worksheets.

## Source of Cost Data:

NA Not Applicable - costs are from previous work or vendor quote

For citation references, the following sources apply:

MII (MII Assemblies), GSA (www.gsa.gov), FLC (www.flcdatcenter.com), A (Allowance), V (Vendor Quote), CW (Means CostWorks 2015), P (Previous Work), and FRTR (www.frtr.gov)

## Cost Adjustment Checklist:

## FACTOR:

H&S Productivity (labor and equipment only)

Escalation to Base Year

Area Cost Factor

Subcontractor Overhead and Profit

Prime Contractor Overhead and Profit

## NOTES:

Field work will be in Level "D" PPE.

MII assembly costs include HPF adjustments.

2015 cost sources are not escalated (EF=1.00). All other costs are escalated based on the USACE CWCCIS, EM 1110-2-1304, Mar 2015.

An AF of 1.05 is used for Oregon, except that an AF of 1.00 (national unmodified average) is used for MII assembly costs and local vendor quotes.

It is assumed that home office OH is 8% and profit is 9% for the Prime Contractor. Professional labor overhead is 100%. Allowances and items with mandated costs such as per diem do not have overhead and profit applied.

Items previously developed by Anchor QEA (2010) already include contractor markups, therefore overhead and profit were not applied to those items.

It is assumed that OH is 1% and profit is 0% for vendor quotes for treatment and disposal at offsite disposal facilities. It is assumed that OH is 5% and profit is 0% for quotes for all other material vendor quotes.

## Abbreviations:

QTY	Quantity	ACR	Acres
EQUIP	Equipment	BCY	Bank Cubic Yard
MATL	Material	CLF	100 Linear Foot
HPF	HTRW Productivity Factor	DY	Days
ADJ LABOR	Adjusted Labor for HFP	EA	Each
ADJ EQUIP	Adjusted Equipment for HFP	LF	Linear Foot
UNMOD UC	Unmodified Unit Cost	HR	Hours
UNMOD LIC	Unmodified Line Item Cost	LB	Pounds
UNBUR LIC	Unburdened Line Item Cost	LCY	Loose Cubic Yard
PC OH	Prime Contractor Overhead	LS	Lump Sum
PC PF	Prime Contractor Profit	RL	Roll
BUR LIC	Burdened Line Item Cost	SY	Square Yard
		TN	Tons

TABLE CW-D17

Alternative D Cost Worksheet: CW-D17

## Capital Cost Sub-Element

## Armor Placement for Technology Assignments

## COST WORKSHEET

Site: Portland Harbor Superfund Site

Prepared By: JN

Date: 7/27/2015

Location: Portland, Oregon

Phase: Draft Feasibility Study

Checked By: AS

Date: 7/28/2015

Base Year: 2015

## Work Statement:

This sub-element involves the placement of armor for the construction of capping areas. It includes placement of armor with confined areas as well as open water areas. It includes costs for on-site labor, equipment, and materials developed from previous work.

## Cost Analysis:

Cost for Armor Placement for Technology Assignments (Lump Sum)

COST DATABASE CODE	DESCRIPTION	QTY	UNIT(S)	HPF	LABOR	ADJ LABOR	EQUIP	ADJ EQUIP	MATL	OTHER	UNMOD UC	UNMOD LIC	PC OH	PC PF	BUR LIC	COST SOURCE CITATION	COMMENTS
	Armor Placement (Riverbanks)																
P3	ODOT 200 Placement (Confined)	5,647	LCY	1.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$58.50	\$58.50	\$330,349.50	0%	0%	\$330,350	P Previous Work	Developed by Anchor QEA (2010)
M2	ODOT 200 Armor	5,647	LCY	1.00	\$0.00	\$0.00	\$0.00	\$0.00	\$57.59	\$0.00	\$57.59	\$325,210.73	0%	0%	\$325,211	P Previous Work	Knife River Quote #7838 (2010)
	Armor Placement (Confined)																
P3	ODOT 200 Placement (Confined)	13,652	LCY	1.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$58.50	\$58.50	\$798,642.00	0%	0%	\$798,642	P Previous Work	Developed by Anchor QEA (2010)
M2	ODOT 200 Armor	13,652	LCY	1.00	\$0.00	\$0.00	\$0.00	\$0.00	\$57.59	\$0.00	\$57.59	\$786,218.68	0%	0%	\$786,219	P Previous Work	Knife River Quote #7838 (2010)
	Armor Placement (Open Water)																
P7	ODOT 200 Placement (Open Water)	24,604	LCY	1.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$28.34	\$28.34	\$697,246.61	0%	0%	\$697,247	P Previous Work	Developed by Anchor QEA (2010)
M2	ODOT 200 Armor	24,604	LCY	1.00	\$0.00	\$0.00	\$0.00	\$0.00	\$57.59	\$0.00	\$57.59	\$1,416,944.36	0%	0%	\$1,416,944	P Previous Work	Knife River Quote #7838 (2010)
TOTAL UNIT COST:															\$4,354,613		

## Notes:

HTRW productivity factor is from Exhibit B-3 or B-4 of "A Guide to Developing and Documenting Cost Estimates During the Feasibility Study", EPA 2000

The Cost Database Code is a reference code for linking with line item cost information with the cost source database and is not otherwise used within these cost worksheets.

## Source of Cost Data:

NA Not Applicable - costs are from previous work or vendor quote

For citation references, the following sources apply:

MII (MII Assemblies), GSA (www.gsa.gov), FLC (www.flcdatcenter.com), A (Allowance), V (Vendor Quote), CW (Means CostWorks 2015), P (Previous Work), and FRTR (www.frtr.gov)

## Cost Adjustment Checklist:

## FACTOR:

H&S Productivity (labor and equipment only)

Escalation to Base Year

Area Cost Factor

Subcontractor Overhead and Profit

Prime Contractor Overhead and Profit

## NOTES:

Field work will be in Level "D" PPE.

MI assembly costs include HPF adjustments.

2015 cost sources are not escalated (EF=1.00). All other costs are escalated based on the USACE CWCCIS, EM 1110-2-1304, Mar 2015.

An AF of 1.05 is used for Oregon, except that an AF of 1.00 (national unmodified average) is used for MII assembly costs and local vendor quotes.

It is assumed that home office OH is 8% and profit is 9% for the Prime Contractor. Professional labor overhead is 100%. Allowances and items with mandated costs such as per diem do not have overhead and profit applied.

Items previously developed by Anchor QEA (2010) already include contractor markups, therefore overhead and profit were not applied to those items.

It is assumed that OH is 1% and profit is 0% for vendor quotes for treatment and disposal at offsite disposal facilities. It is assumed that OH is 5% and profit is 0% for quotes for all other material vendor quotes.

## Abbreviations:

QTY	Quantity	ACR	Acre
EQUIP	Equipment	BCY	Bank Cubic Yard
MATL	Material	CLF	100 Linear Foot
HPF	HTRW Productivity Factor	DY	Days
ADJ LABOR	Adjusted Labor for HFP	EA	Each
ADJ EQUIP	Adjusted Equipment for HFP	LF	Linear Foot
UNMOD UC	Unmodified Unit Cost	HR	Hours
UNMOD LIC	Unmodified Line Item Cost	LB	Pounds
UNBUR LIC	Unburdened Line Item Cost	LCY	Loose Cubic Yard
PC OH	Prime Contractor Overhead	LS	Lump Sum
PC PF	Prime Contractor Profit	RL	Roll
BUR LIC	Burdened Line Item Cost	SY	Square Yard
		TN	Tons

TABLE CW-D18

Alternative D Cost Worksheet: CW-D18

## Capital Cost Sub-Element

## Reactive/GAC Placement for Technology Assignments

## COST WORKSHEET

Site: Portland Harbor Superfund Site

Location: Portland, Oregon

Phase: Draft Feasibility Study

Base Year: 2015

Prepared By: JN

Date: 7/27/2015

Checked By: AS

Date: 7/28/2015

## Work Statement:

This sub-element involves the placement of the reactive layers for the construction of capping areas. It includes placement of armor within confined areas as well as open water areas. It includes costs for on-site labor, equipment, and materials developed from previous work, as well as recent vendor quotes.

## Cost Analysis:

Cost for Reactive/GAC Placement for Technology Assignments (Lump Sum)

COST DATABASE CODE	DESCRIPTION	QTY	UNIT(S)	HPF	LABOR	ADJ LABOR	EQUIP	ADJ EQUIP	MATL	OTHER	UNMOD UC	UNMOD LIC	PC OH	PC PF	BUR LIC	COST SOURCE CITATION	COMMENTS
	Reactive/GAC Placement (Riverbanks)																
P40	Carbon (AquaGate + PAC 5%) Placement (Confined)	721	TON	1.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$816.75	\$816.75	\$588,876.75	0%	0%	\$588,877	P Previous Work	Adapted from unit cost developed by Anchor QEA (2010). Unit cost is \$/TON as carbon
M4	Carbon (AquaGate + PAC 5%)	721	TON	1.00	\$0.00	\$0.00	\$0.00	\$0.00	\$8,000.00	\$0.00	\$8,000.00	\$5,768,000.00	5%	0%	\$6,056,400	V Vendor Quote	Vendor Quote - AquaBlok 2015. Material cost is \$/TON (as Carbon).
	Reactive/GAC Placement (Confined)																
P40	Carbon (AquaGate + PAC 5%) Placement (Confined)	935	TON	1.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$816.75	\$816.75	\$763,661.25	0%	0%	\$763,661	P Previous Work	Adapted from unit cost developed by Anchor QEA (2010). Unit cost is \$/TON as carbon
M4	Carbon (AquaGate + PAC 5%)	935	TON	1.00	\$0.00	\$0.00	\$0.00	\$0.00	\$8,000.00	\$0.00	\$8,000.00	\$7,480,000.00	5%	0%	\$7,854,000	V Vendor Quote	Vendor Quote - AquaBlok 2015. Material cost is \$/TON (as Carbon).
	Reactive/GAC Placement (Open Water)																
P41	Carbon (AquaGate + PAC 5%) Placement (Open Water)	7,713	TON	1.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$396.00	\$396.00	\$3,054,348.00	0%	0%	\$3,054,348	P Previous Work	Adapted from unit cost developed by Anchor QEA (2010). Unit cost is \$/TON as carbon.
M4	Carbon (AquaGate + PAC 5%)	7,713	TON	1.00	\$0.00	\$0.00	\$0.00	\$0.00	\$8,000.00	\$0.00	\$8,000.00	\$61,704,000.00	5%	0%	\$64,789,200	V Vendor Quote	Vendor Quote - AquaBlok 2015. Material cost is \$/TON (as Carbon).
TOTAL UNIT COST:															\$76,461,209		

## Notes:

HTRW productivity factor is from Exhibit B-3 or B-4 of "A Guide to Developing and Documenting Cost Estimates During the Feasibility Study", EPA 2000

The Cost Database Code is a reference code for linking with line item cost information with the cost source database and is not otherwise used within these cost worksheets.

## Source of Cost Data:

NA Not Applicable - costs are from previous work or vendor quote

For citation references, the following sources apply:

MII (MII Assemblies), GSA (www.gsa.gov), FLC (www.flcdatcenter.com), A (Allowance), V (Vendor Quote), CW (Means CostWorks 2015), P (Previous Work), and FRTR (www.frtr.gov)

## Cost Adjustment Checklist:

FACTOR:

H&S Productivity (labor and equipment only)

Escalation to Base Year

Area Cost Factor

Subcontractor Overhead and Profit

Prime Contractor Overhead and Profit

## NOTES:

Field work will be in Level "D" PPE.

MII assembly costs include HPF adjustments.

2015 cost sources are not escalated (EF=1.00). All other costs are escalated based on the USACE CWCCIS, EM 1110-2-1304, Mar 2015.

An AF of 1.05 is used for Oregon, except that an AF of 1.00 (national unmodified average) is used for MII assembly costs and local vendor quotes.

It is assumed that home office OH is 8% and profit is 9% for the Prime Contractor. Professional labor overhead is 100%. Allowances and items with mandated costs such as per diem do not have overhead and profit applied.

Items previously developed by Anchor QEA (2010) already include contractor markups, therefore overhead and profit were not applied to those items.

It is assumed that OH is 1% and profit is 0% for vendor quotes for treatment and disposal at offsite disposal facilities. It is assumed that OH is 5% and profit is 0% for quotes for all other material vendor quotes.

## Abbreviations:

QTY	Quantity	ACR	Acres
EQUIP	Equipment	BCY	Bank Cubic Yard
MATL	Material	CLF	100 Linear Foot
HPF	HTRW Productivity Factor	DY	Days
ADJ LABOR	Adjusted Labor for HFP	EA	Each
ADJ EQUIP	Adjusted Equipment for HFP	LF	Linear Foot
UNMOD UC	Unmodified Unit Cost	HR	Hours
UNMOD LIC	Unmodified Line Item Cost	LB	Pounds
UNBUR LIC	Unburdened Line Item Cost	LCY	Loose Cubic Yard
PC OH	Prime Contractor Overhead	LS	Lump Sum
PC PF	Prime Contractor Profit	RL	Roll
BUR LIC	Burdened Line Item Cost	SY	Square Yard
		TN	Tons

TABLE CW-D19

**Alternative D**  
**Capital Cost Sub-Element**  
**Geofabric for Riverbanks**

**Cost Worksheet: CW-D19**

**COST WORKSHEET**

**Site:** Portland Harbor Superfund Site  
**Location:** Portland, Oregon  
**Phase:** Draft Feasibility Study  
**Base Year:** 2015

**Prepared By:** JN **Date:** 7/27/2015

**Checked By:** AS **Date:** 7/28/2015

**Work Statement:**

This sub-element involves the installation of geofabric along the riverbanks. It includes costs for on-site labor, equipment, and materials developed from previous work.

**Cost Analysis:**

Cost for Geofabric for Riverbanks (Lump Sum)

COST DATABASE CODE	DESCRIPTION	QTY	UNIT(S)	HPF	LABOR	ADJ LABOR	EQUIP	ADJ EQUIP	MATL	OTHER	UNMOD UC	UNMOD LIC	PC OH	PC PF	BUR LIC	COST SOURCE CITATION	COMMENTS
P51	Geotextile Installation	14.8	AC	1.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$7,060.20	\$7,060.20	\$104,491.03	8%	9%	\$123,007	P Previous Work	Vendor Quote - Geo-Synthetics (2014). Includes labor and equipment for installation
M13	Geotextile	14.8	AC	1.00	\$0.00	\$0.00	\$0.00	\$0.00	\$5,687.39	\$0.00	\$5,687.39	\$84,173.37	5%	0%	\$88,382	V Vendor Quote	Vendor Quote (2014)
<b>TOTAL UNIT COST:</b>															\$211,389		

**Notes:**

HTRW productivity factor is from Exhibit B-3 or B-4 of "A Guide to Developing and Documenting Cost Estimates During the Feasibility Study", EPA 2000  
The Cost Database Code is a reference code for linking with line item cost information with the cost source database and is not otherwise used within these cost worksheets.

**Source of Cost Data:**

NA Not Applicable - costs are from previous work or vendor quote

For citation references, the following sources apply:

MII (MII Assemblies), GSA (www.gsa.gov), FLC (www.flcdatabase.com), A (Allowance), V (Vendor Quote), CW (Means CostWorks 2015), P (Previous Work), and FRTR (www.frtr.gov)

**Cost Adjustment Checklist:**

FACTOR:  
H&S Productivity (labor and equipment only)  
Escalation to Base Year  
Area Cost Factor  
Subcontractor Overhead and Profit  
Prime Contractor Overhead and Profit

**NOTES:**

Field work will be in Level "D" PPE.

MII assembly costs include HPF adjustments.

2015 cost sources are not escalated (EF=1.00). All other costs are escalated based on the USACE CWCCIS, EM 1110-2-1304, Mar 2015.

An AF of 1.05 is used for Oregon, except that an AF of 1.00 (national unmodified average) is used for MII assembly costs and local vendor quotes.

It is assumed that home office OH is 8% and profit is 9% for the Prime Contractor. Professional labor overhead is 100%. Allowances and items with mandated costs such as per diem do not have overhead and profit applied.

Items previously developed by Anchor QEA (2010) already include contractor markups, therefore overhead and profit were not applied to those items.

It is assumed that OH is 1% and profit is 0% for vendor quotes for treatment and disposal at offsite disposal facilities. It is assumed that OH is 5% and profit is 0% for quotes for all other material vendor quotes.

**Abbreviations:**

QTY	Quantity	ACR	Acres
EQUIP	Equipment	BCY	Bank Cubic Yard
MATL	Material	CLF	100 Linear Foot
HPF	HTRW Productivity Factor	DY	Days
ADJ LABOR	Adjusted Labor for HFP	EA	Each
ADJ EQUIP	Adjusted Equipment for HFP	LF	Linear Foot
UNMOD UC	Unmodified Unit Cost	HR	Hours
UNMOD LIC	Unmodified Line Item Cost	LB	Pounds
UNBUR LIC	Unburdened Line Item Cost	LCY	Loose Cubic Yard
PC OH	Prime Contractor Overhead	LS	Lump Sum
PC PF	Prime Contractor Profit	RL	Roll
BUR LIC	Burdened Line Item Cost	SY	Square Yard
		TN	Tons

TABLE CW-D20

Alternative D Cost Worksheet: CW-D20

## Capital Cost Sub-Element

## Organoclay Mat Placement for Technology Assignments

## COST WORKSHEET

Site: Portland Harbor Superfund Site  
 Location: Portland, Oregon  
 Phase: Draft Feasibility Study  
 Base Year: 2015

Prepared By: JN Date: 7/27/2015  
 Checked By: AS Date: 7/28/2015

## Work Statement:

This sub-element involves the placement of the organoclay mat for the construction of capping areas. It includes placement of the organoclay mat within confined areas as well as open water areas. It includes costs for on-site labor, equipment, and materials developed from previous work.

## Cost Analysis:

Cost for Organoclay Mat Placement for Technology Assignments (Lump Sum)

COST DATABASE CODE	DESCRIPTION	QTY	UNIT(S)	HPF	LABOR	ADJ LABOR	EQUIP	ADJ EQUIP	MATL	OTHER	UNMOD UC	UNMOD LIC	PC OH	PC PF	BUR LIC	COST SOURCE CITATION	COMMENTS
	<b>Organoclay Mat Placement (Riverbanks)</b>																
P23	Organoclay Mat Material and Placement (Confined)	39,204	SF	1.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$23.74	\$23.74	\$930,604.95	0%	0%	\$930,605	P Previous Work	Developed by Anchor QEA (2010)
	<b>Organoclay Mat Placement (Confined)</b>																
P23	Organoclay Mat Material and Placement (Confined)	139,392	SF	1.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$23.74	\$23.74	\$3,308,817.60	0%	0%	\$3,308,818	P Previous Work	Developed by Anchor QEA (2010)
	<b>Organoclay Mat Placement (Open Water)</b>																
P24	Organoclay Mat Material and Placement (Open)	596,772	SF	1.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$7.09	\$7.09	\$4,229,621.55	0%	0%	\$4,229,622	P Previous Work	Developed by Anchor QEA (2010)
<b>TOTAL UNIT COST:</b>															<b>\$7,538,440</b>		

## Notes:

HTRW productivity factor is from Exhibit B-3 or B-4 of "A Guide to Developing and Documenting Cost Estimates During the Feasibility Study", EPA 2000

The Cost Database Code is a reference code for linking with line item cost information with the cost source database and is not otherwise used within these cost worksheets.

## Source of Cost Data:

NA Not Applicable - costs are from previous work or vendor quote

For citation references, the following sources apply:

MII (MII Assemblies), GSA (www.gsa.gov), FLC (www.flcdatcenter.com), A (Allowance), V (Vendor Quote), CW (Means CostWorks 2015), P (Previous Work), and FRTR (www.frtr.gov)

## Cost Adjustment Checklist:

FACTOR:  
 H&S Productivity (labor and equipment only)  
 Escalation to Base Year  
 Area Cost Factor  
 Subcontractor Overhead and Profit  
 Prime Contractor Overhead and Profit

## NOTES:

Field work will be in Level "D" PPE.

MII assembly costs include HPF adjustments.

2015 cost sources are not escalated (EF=1.00). All other costs are escalated based on the USACE CWCCIS, EM 1110-2-1304, Mar 2015.

An AF of 1.05 is used for Oregon, except that an AF of 1.00 (national unmodified average) is used for MII assembly costs and local vendor quotes.

It is assumed that home office OH is 8% and profit is 9% for the Prime Contractor. Professional labor overhead is 100%. Allowances and items with mandated costs such as per diem do not have overhead and profit applied.

Items previously developed by Anchor QEA (2010) already include contractor markups, therefore overhead and profit were not applied to those items.

It is assumed that OH is 1% and profit is 0% for vendor quotes for treatment and disposal at offsite disposal facilities. It is assumed that OH is 5% and profit is 0% for quotes for all other material vendor quotes.

## Abbreviations:

QTY	Quantity	ACR	Acre
EQUIP	Equipment	BCY	Bank Cubic Yard
MATL	Material	CLF	100 Linear Foot
HPF	HTRW Productivity Factor	DY	Days
ADJ LABOR	Adjusted Labor for HFP	EA	Each
ADJ EQUIP	Adjusted Equipment for HFP	LF	Linear Foot
UNMOD UC	Unmodified Unit Cost	HR	Hours
UNMOD LIC	Unmodified Line Item Cost	LB	Pounds
UNBUR LIC	Unburdened Line Item Cost	LCY	Loose Cubic Yard
PC OH	Prime Contractor Overhead	LS	Lump Sum
PC PF	Prime Contractor Profit	RL	Roll
BUR LIC	Burdened Line Item Cost	SY	Square Yard
		TN	Tons

TABLE CW-D21

<div style="display: flex; justify-content: space-between;"> <span><b>Alternative D</b></span> <span><b>Cost Worksheet: CW-D21</b></span> </div> <div style="display: flex; justify-content: space-between; margin-top: 5px;"> <span><b>Capital Cost Sub-Element</b></span> <span><b>COST WORKSHEET</b></span> </div> <div style="display: flex; justify-content: space-between; margin-top: 5px;"> <span><b>Transload Facility Development</b></span> </div>																																																																					
<b>Site:</b> Portland Harbor Superfund Site <b>Location:</b> Portland, Oregon <b>Phase:</b> Draft Feasibility Study <b>Base Year:</b> 2015												<b>Prepared By:</b> JN  <b>Checked By:</b> AS		<b>Date:</b> 7/27/2015  <b>Date:</b> 7/28/2015																																																							
<b>Work Statement:</b> This sub-element involves the development of a transload facility for facilitating offsite disposal of contaminated sediments. It includes costs for on-site labor, equipment, and materials developed from previous work. Transload facility is expected to be operated for 5 years, based on estimated construction duration.																																																																					
<b>Cost Analysis:</b> Cost for Transload Facility Development (Lump Sum)																																																																					
COST DATABASE CODE	DESCRIPTION	QTY	UNIT(S)	HPF	LABOR	ADJ LABOR	EQUIP	ADJ EQUIP	MATL	OTHER	UNMOD UC	UNMOD LIC	PC OH	PC PF	BUR LIC	COST SOURCE CITATION	COMMENTS																																																				
	Transload Facility Development																																																																				
P31	Transload Facility Permitting	1	LS	1.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$45,000.00	\$45,000.00	\$45,000.00	0%	0%	\$45,000	P Previous Work	Developed by Anchor QEA (2010)																																																				
P32	Transload Facility Development	1	LS	1.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$8,437,500.00	\$8,437,500.00	\$8,437,500.00	0%	0%	\$8,437,500	P Previous Work	Developed by Anchor QEA (2010)																																																				
P33	Yearly Property Lease	100	AC	1.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$26,437.50	\$26,437.50	\$2,643,750.00	0%	0%	\$2,643,750	P Previous Work	Developed by Anchor QEA (2010)																																																				
	<b>Inspection and Monitoring of Transload Facility</b>																																																																				
P34	Labor Inspections During Operations of Transload Facility	12.5	FTE	1.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$84,375.00	\$84,375.00	\$1,054,687.50	0%	0%	\$1,054,688	P Previous Work	Developed by Anchor QEA (2010)																																																				
P35	Environmental Monitoring During Offloading a Transload Facility	20	MO	1.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$16,875.00	\$16,875.00	\$337,500.00	0%	0%	\$337,500	P Previous Work	Developed by Anchor QEA (2010)																																																				
P36	Inspection and Monitoring Reporting for Transload Facility	5	YR	1.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$45,000.00	\$45,000.00	\$225,000.00	0%	0%	\$225,000	P Previous Work	Developed by Anchor QEA (2010)																																																				
												<b>TOTAL UNIT COST:</b>		\$12,743,438																																																							
<b>Notes:</b> HTRW productivity factor is from Exhibit B-3 or B-4 of "A Guide to Developing and Documenting Cost Estimates During the Feasibility Study", EPA 2000 The Cost Database Code is a reference code for linking with line item cost information with the cost source database and is not otherwise used within these cost worksheets.																																																																					
<b>Source of Cost Data:</b> NA Not Applicable - costs are from previous work or vendor quote For citation references, the following sources apply: MII (MII Assemblies), GSA (www.gsa.gov), FLC (www.flcdatcenter.com), A (Allowance), V (Vendor Quote), CW (Means CostWorks 2015), P (Previous Work), and FRTR (www.frtr.gov)																																																																					
<div style="display: flex; justify-content: space-between;"> <div style="width: 45%;"> <b>Cost Adjustment Checklist:</b>            FACTOR:            H&amp;S Productivity (labor and equipment only)            Escalation to Base Year            Area Cost Factor            Subcontractor Overhead and Profit            Prime Contractor Overhead and Profit         </div> <div style="width: 45%;"> <b>NOTES:</b>            Field work will be in Level "D" PPE.            MII assembly costs include HPF adjustments.            2015 cost sources are not escalated (EF=1.00). All other costs are escalated based on the USACE CWCCIS, EM 1110-2-1304, Mar 2015.            An AF of 1.05 is used for Oregon, except that an AF of 1.00 (national unmodified average) is used for MII assembly costs and local vendor quotes.            It is assumed that home office OH is 8% and profit is 9% for the Prime Contractor. Professional labor overhead is 100%. Allowances and items with mandated costs such as per diem do not have overhead and profit applied.            Items previously developed by Anchor QEA (2010) already include contractor markups, therefore overhead and profit were not applied to those items.            It is assumed that OH is 1% and profit is 0% for vendor quotes for treatment and disposal at offsite disposal facilities. It is assumed that OH is 5% and profit is 0% for quotes for all other material vendor quotes.         </div> </div>																																																																					
<b>Abbreviations:</b> <table style="width: 100%; border: none;"> <tr> <td style="width: 33%;">QTY</td> <td style="width: 33%;">Quantity</td> <td style="width: 33%;">ACR</td> <td style="width: 33%;">Acres</td> </tr> <tr> <td>EQUIP</td> <td>Equipment</td> <td>BCY</td> <td>Bank Cubic Yard</td> </tr> <tr> <td>MATL</td> <td>Material</td> <td>CLF</td> <td>100 Linear Foot</td> </tr> <tr> <td>HPF</td> <td>HTRW Productivity Factor</td> <td>DY</td> <td>Days</td> </tr> <tr> <td>ADJ LABOR</td> <td>Adjusted Labor for HFP</td> <td>EA</td> <td>Each</td> </tr> <tr> <td>ADJ EQUIP</td> <td>Adjusted Equipment for HFP</td> <td>LF</td> <td>Linear Foot</td> </tr> <tr> <td>UNMOD UC</td> <td>Unmodified Unit Cost</td> <td>HR</td> <td>Hours</td> </tr> <tr> <td>UNMOD LIC</td> <td>Unmodified Line Item Cost</td> <td>LB</td> <td>Pounds</td> </tr> <tr> <td>UNBUR LIC</td> <td>Unburdened Line Item Cost</td> <td>LCY</td> <td>Loose Cubic Yard</td> </tr> <tr> <td>PC OH</td> <td>Prime Contractor Overhead</td> <td>LS</td> <td>Lump Sum</td> </tr> <tr> <td>PC PF</td> <td>Prime Contractor Profit</td> <td>RL</td> <td>Roll</td> </tr> <tr> <td>BUR LIC</td> <td>Burdened Line Item Cost</td> <td>SY</td> <td>Square Yard</td> </tr> <tr> <td></td> <td></td> <td>TN</td> <td>Tons</td> </tr> </table>																		QTY	Quantity	ACR	Acres	EQUIP	Equipment	BCY	Bank Cubic Yard	MATL	Material	CLF	100 Linear Foot	HPF	HTRW Productivity Factor	DY	Days	ADJ LABOR	Adjusted Labor for HFP	EA	Each	ADJ EQUIP	Adjusted Equipment for HFP	LF	Linear Foot	UNMOD UC	Unmodified Unit Cost	HR	Hours	UNMOD LIC	Unmodified Line Item Cost	LB	Pounds	UNBUR LIC	Unburdened Line Item Cost	LCY	Loose Cubic Yard	PC OH	Prime Contractor Overhead	LS	Lump Sum	PC PF	Prime Contractor Profit	RL	Roll	BUR LIC	Burdened Line Item Cost	SY	Square Yard			TN	Tons
QTY	Quantity	ACR	Acres																																																																		
EQUIP	Equipment	BCY	Bank Cubic Yard																																																																		
MATL	Material	CLF	100 Linear Foot																																																																		
HPF	HTRW Productivity Factor	DY	Days																																																																		
ADJ LABOR	Adjusted Labor for HFP	EA	Each																																																																		
ADJ EQUIP	Adjusted Equipment for HFP	LF	Linear Foot																																																																		
UNMOD UC	Unmodified Unit Cost	HR	Hours																																																																		
UNMOD LIC	Unmodified Line Item Cost	LB	Pounds																																																																		
UNBUR LIC	Unburdened Line Item Cost	LCY	Loose Cubic Yard																																																																		
PC OH	Prime Contractor Overhead	LS	Lump Sum																																																																		
PC PF	Prime Contractor Profit	RL	Roll																																																																		
BUR LIC	Burdened Line Item Cost	SY	Square Yard																																																																		
		TN	Tons																																																																		

TABLE CW-D22

<b>TABLE CW-D22</b>																	
<div style="display: flex; justify-content: space-between;"> <div> <b>Alternative D</b>  <b>Capital Cost Sub-Element</b>  <b>Monitored Natural Recovery (MNR) for MNR/Enhanced Monitored Natural Recovery (EMNR) and Broadcast GAC Areas</b> </div> <div> <b>Cost Worksheet: CW-D22</b> </div> <div style="text-align: right;"> <b>COST WORKSHEET</b> </div> </div>																	
<b>Site:</b> Portland Harbor Superfund Site <b>Location:</b> Portland, Oregon <b>Phase:</b> Draft Feasibility Study <b>Base Year:</b> 2015												<b>Prepared By:</b> JN <b>Date:</b> 7/27/2015			<b>Checked By:</b> AS <b>Date:</b> 7/28/2015		
<b>Work Statement:</b> This sub-element involves sampling as part of monitored natural recovery for MNR, EMNR, and Broadcast GAC areas. It includes costs for on-site labor, equipment, and materials developed from previous work.																	
<b>Cost Analysis:</b> Cost for Monitored Natural Recovery for MNR/EMNR and Broadcast GAC Areas (Lump Sum)																	
COST DATABASE CODE	DESCRIPTION	QTY	UNIT(S)	HPF	LABOR	ADJ LABOR	EQUIP	ADJ EQUIP	MATL	OTHER	UNMOD UC	UNMOD LIC	PC OH	PC PF	BUR LIC	COST SOURCE CITATION	COMMENTS
P25	Monitored Natural Recovery	2,471	AC	1.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$3,679.79	\$3,679.79	\$9,092,748.74	0%	0%	\$9,092,749	P Previous Work	Developed by Anchor QEA (2010)
												<b>TOTAL UNIT COST:</b>		\$9,092,749			
<div style="display: flex; justify-content: space-between;"> <div> <b>Notes:</b>            HTRW productivity factor is from Exhibit B-3 or B-4 of "A Guide to Developing and Documenting Cost Estimates During the Feasibility Study", EPA 2000            The Cost Database Code is a reference code for linking with line item cost information with the cost source database and is not otherwise used within these cost worksheets.         </div> <div> <b>Abbreviations:</b>            QTY Quantity            EQUIP Equipment            MATL Material            HPF HTRW Productivity Factor            ADJ LABOR Adjusted Labor for HFP            ADJ EQUIP Adjusted Equipment for HFP            UNMOD UC Unmodified Unit Cost            UNMOD LIC Unmodified Line Item Cost            UNBUR LIC Unburdened Line Item Cost            PC OH Prime Contractor Overhead            PC PF Prime Contractor Profit            BUR LIC Burdened Line Item Cost         </div> <div>           ACR Acres            BCY Bank Cubic Yard            CLF 100 Linear Foot            DY Days            EA Each            LF Linear Foot            HR Hours            LB Pounds            LCY Loose Cubic Yard            LS Lump Sum            RL Roll            SY Square Yard            TN Tons         </div> </div>																	
<b>Source of Cost Data:</b> NA Not Applicable - costs are from previous work or vendor quote For citation references, the following sources apply: MII (MII Assemblies), GSA (www.gsa.gov), FLC (www.flcdatabase.com), A (Allowance), V (Vendor Quote), CW (Means CostWorks 2015), P (Previous Work), and FRTR (www.frtr.gov)																	
<b>Cost Adjustment Checklist:</b> FACTOR: Field work will be in Level "D" PPE. H&S Productivity (labor and equipment only) MII assembly costs include HPF adjustments. Escalation to Base Year 2015 cost sources are not escalated (EF=1.00). All other costs are escalated based on the USACE CWCCIS, EM 1110-2-1304, Mar 2015. Area Cost Factor An AF of 1.05 is used for Oregon, except that an AF of 1.00 (national unmodified average) is used for MII assembly costs and local vendor quotes. Subcontractor Overhead and Profit It is assumed that home office OH is 8% and profit is 9% for the Prime Contractor. Professional labor overhead is 100%. Allowances and items with mandated costs such as per diem do not have overhead and profit applied. Prime Contractor Overhead and Profit Items previously developed by Anchor QEA (2010) already include contractor markups, therefore overhead and profit were not applied to those items. It is assumed that OH is 1% and profit is 0% for vendor quotes for treatment and disposal at offsite disposal facilities. It is assumed that OH is 5% and profit is 0% for quotes for all other material vendor quotes.																	



TABLE CW-D23

Alternative D												Cost Worksheet: CW-D23				COST WORKSHEET																																						
Capital Cost Sub-Element																																																						
Site-Wide Monitoring																																																						
<b>Site:</b> Portland Harbor Superfund Site <b>Location:</b> Portland, Oregon <b>Phase:</b> Draft Feasibility Study <b>Base Year:</b> 2015												<b>Prepared By:</b> JN <b>Checked By:</b> AS				<b>Date:</b> 7/27/2015 <b>Date:</b> 7/28/2015																																						
<b>Work Statement:</b> This sub-element involves sampling, surveying, data management, and reporting as part of sitewide monitoring. It includes costs for on-site labor, equipment, and materials developed from previous work.																																																						
<b>Cost Analysis:</b> Cost for Site-Wide Monitoring (Lump Sum)																																																						
COST DATABASE CODE	DESCRIPTION	QTY	UNIT(S)	HPF	LABOR	ADJ LABOR	EQUIP	ADJ EQUIP	MATL	OTHER	UNMOD UC	UNMOD LIC	PC OH	PC PF	BUR LIC	COST SOURCE CITATION	COMMENTS																																					
	Site-Wide Monitoring																																																					
P26	Sitewide Monitoring	1	LS	1.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$955,959.75	\$955,959.75	\$955,959.75	0%	0%	\$955,960	P Previous Work	Includes onsite dust control and pavement washing																																					
TOTAL UNIT COST:																\$955,960																																						
<b>Notes:</b> HTRW productivity factor is from Exhibit B-3 or B-4 of "A Guide to Developing and Documenting Cost Estimates During the Feasibility Study", EPA 2000 The Cost Database Code is a reference code for linking with line item cost information with the cost source database and is not otherwise used within these cost worksheets.																																																						
<b>Source of Cost Data:</b> NA Not Applicable - costs are from previous work or vendor quote For citation references, the following sources apply: MII (MII Assemblies), GSA (www.gsa.gov), FLC (www.flcdatcenter.com), A (Allowance), V (Vendor Quote), CW (Means CostWorks 2015), P (Previous Work), and FRTR (www.frtr.gov)																																																						
<b>Cost Adjustment Checklist:</b> FACTOR: H&S Productivity (labor and equipment only) Escalation to Base Year Area Cost Factor Subcontractor Overhead and Profit Prime Contractor Overhead and Profit																																																						
<b>NOTES:</b> Field work will be in Level "D" PPE. MII assembly costs include HPF adjustments. 2015 cost sources are not escalated (EF=1.00). All other costs are escalated based on the USACE CWCCIS, EM 1110-2-1304, Mar 2015. An AF of 1.05 is used for Oregon, except that an AF of 1.00 (national unmodified average) is used for MII assembly costs and local vendor quotes. It is assumed that home office OH is 8% and profit is 9% for the Prime Contractor. Professional labor overhead is 100%. Allowances and items with mandated costs such as per diem do not have overhead and profit applied. Items previously developed by Anchor QEA (2010) already include contractor markups, therefore overhead and profit were not applied to those items. It is assumed that OH is 1% and profit is 0% for vendor quotes for treatment and disposal at offsite disposal facilities. It is assumed that OH is 5% and profit is 0% for quotes for all other material vendor quotes.																																																						
<b>Abbreviations:</b> <table style="width: 100%; border: none;"> <tr> <td style="width: 33%;">QTY Quantity</td> <td style="width: 33%;">ACR Acres</td> <td style="width: 33%;"></td> </tr> <tr> <td>EQUIP Equipment</td> <td>BCY Bank Cubic Yard</td> <td></td> </tr> <tr> <td>MATL Material</td> <td>CLF 100 Linear Foot</td> <td></td> </tr> <tr> <td>HPF HTRW Productivity Factor</td> <td>DY Days</td> <td></td> </tr> <tr> <td>ADJ LABOR Adjusted Labor for HFP</td> <td>EA Each</td> <td></td> </tr> <tr> <td>ADJ EQUIP Adjusted Equipment for HFP</td> <td>LF Linear Foot</td> <td></td> </tr> <tr> <td>UNMOD UC Unmodified Unit Cost</td> <td>HR Hours</td> <td></td> </tr> <tr> <td>UNMOD LIC Unmodified Line Item Cost</td> <td>LB Pounds</td> <td></td> </tr> <tr> <td>UNBUR LIC Unburdened Line Item Cost</td> <td>LCY Loose Cubic Yard</td> <td></td> </tr> <tr> <td>PC OH Prime Contractor Overhead</td> <td>LS Lump Sum</td> <td></td> </tr> <tr> <td>PC PF Prime Contractor Profit</td> <td>RL Roll</td> <td></td> </tr> <tr> <td>BUR LIC Burdened Line Item Cost</td> <td>SY Square Yard</td> <td></td> </tr> <tr> <td></td> <td>TN Tons</td> <td></td> </tr> </table>																QTY Quantity	ACR Acres		EQUIP Equipment	BCY Bank Cubic Yard		MATL Material	CLF 100 Linear Foot		HPF HTRW Productivity Factor	DY Days		ADJ LABOR Adjusted Labor for HFP	EA Each		ADJ EQUIP Adjusted Equipment for HFP	LF Linear Foot		UNMOD UC Unmodified Unit Cost	HR Hours		UNMOD LIC Unmodified Line Item Cost	LB Pounds		UNBUR LIC Unburdened Line Item Cost	LCY Loose Cubic Yard		PC OH Prime Contractor Overhead	LS Lump Sum		PC PF Prime Contractor Profit	RL Roll		BUR LIC Burdened Line Item Cost	SY Square Yard			TN Tons	
QTY Quantity	ACR Acres																																																					
EQUIP Equipment	BCY Bank Cubic Yard																																																					
MATL Material	CLF 100 Linear Foot																																																					
HPF HTRW Productivity Factor	DY Days																																																					
ADJ LABOR Adjusted Labor for HFP	EA Each																																																					
ADJ EQUIP Adjusted Equipment for HFP	LF Linear Foot																																																					
UNMOD UC Unmodified Unit Cost	HR Hours																																																					
UNMOD LIC Unmodified Line Item Cost	LB Pounds																																																					
UNBUR LIC Unburdened Line Item Cost	LCY Loose Cubic Yard																																																					
PC OH Prime Contractor Overhead	LS Lump Sum																																																					
PC PF Prime Contractor Profit	RL Roll																																																					
BUR LIC Burdened Line Item Cost	SY Square Yard																																																					
	TN Tons																																																					

TABLE CW-D24

<div style="display: flex; justify-content: space-between;"> <span><b>Alternative D</b></span> <span><b>Cost Worksheet: CW-D24</b></span> </div> <div style="display: flex; justify-content: space-between; margin-top: 5px;"> <span><b>Capital Cost Sub-Element</b></span> <span><b>COST WORKSHEET</b></span> </div> <div style="display: flex; justify-content: space-between; margin-top: 5px;"> <span><b>Cap Area Monitoring and Reactive Layer Monitoring</b></span> </div>																	
<b>Site:</b> Portland Harbor Superfund Site <b>Location:</b> Portland, Oregon <b>Phase:</b> Draft Feasibility Study <b>Base Year:</b> 2015												<b>Prepared By:</b> JN  <b>Checked By:</b> AS		<b>Date:</b> 7/27/2015  <b>Date:</b> 7/28/2015			
<b>Work Statement:</b> This sub-element involves sampling, surveying, data management, and reporting as part of cap and reactive layer monitoring. It includes costs for on-site labor, equipment, and materials developed from previous work.																	
<b>Cost Analysis:</b> Cost for Cap and Reactive Layer Monitoring (Lump Sum)																	
COST DATABASE CODE	DESCRIPTION	QTY	UNIT(S)	HPF	LABOR	ADJ LABOR	EQUIP	ADJ EQUIP	MATL	OTHER	UNMOD UC	UNMOD LIC	PC OH	PC PF	BUR LIC	COST SOURCE CITATION	COMMENTS
	Cap Area Monitoring																
P27	Cap Monitoring	130	AC	1.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$78,821.21	\$78,821.21	\$10,262,521.87	0%	0%	\$10,262,522	P Previous Work	Developed by Anchor QEA (2010)
	Reactive Layer Monitoring																
P28	Reactive Layer Monitoring	126.3	AC	1.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$88,810.88	\$88,810.88	\$11,216,813.51	0%	0%	\$11,216,814	P Previous Work	Developed by Anchor QEA (2010)
<b>TOTAL UNIT COST:</b>															\$21,479,336		
<div style="display: flex; justify-content: space-between;"> <div style="width: 60%;"> <b>Notes:</b>            HTRW productivity factor is from Exhibit B-3 or B-4 of "A Guide to Developing and Documenting Cost Estimates During the Feasibility Study", EPA 2000            The Cost Database Code is a reference code for linking with line item cost information with the cost source database and is not otherwise used within these cost worksheets.   <b>Source of Cost Data:</b>            NA Not Applicable - costs are from previous work or vendor quote            For citation references, the following sources apply:            MII (MII Assemblies), GSA (www.gsa.gov), FLC (www.flcdatacenter.com), A (Allowance), V (Vendor Quote), CW (Means CostWorks 2015), P (Previous Work), and FRTR (www.frtr.gov)         </div> <div style="width: 35%;"> <b>Abbreviations:</b>            QTY Quantity            EQUIP Equipment            MATL Material            HPF HTRW Productivity Factor            ADJ LABOR Adjusted Labor for HFP            ADJ EQUIP Adjusted Equipment for HFP            UNMOD UC Unmodified Unit Cost            UNMOD LIC Unmodified Line Item Cost            UNBUR LIC Unburdened Line Item Cost            PC OH Prime Contractor Overhead            PC PF Prime Contractor Profit            BUR LIC Burdened Line Item Cost         </div> <div style="width: 40%;">           ACR Acres            BCY Bank Cubic Yard            CLF 100 Linear Foot            DY Days            EA Each            LF Linear Foot            HR Hours            LB Pounds            LCY Loose Cubic Yard            LS Lump Sum            RL Roll            SY Square Yard            TN Tons         </div> </div>																	
<b>Cost Adjustment Checklist:</b> FACTOR: Field work will be in Level "D" PPE. H&S Productivity (labor and equipment only) MII assembly costs include HPF adjustments. Escalation to Base Year 2015 cost sources are not escalated (EF=1.00). All other costs are escalated based on the USACE CWCCIS, EM 1110-2-1304, Mar 2015. Area Cost Factor An AF of 1.05 is used for Oregon, except that an AF of 1.00 (national unmodified average) is used for MII assembly costs and local vendor quotes. Subcontractor Overhead and Profit It is assumed that home office OH is 8% and profit is 9% for the Prime Contractor. Professional labor overhead is 100%. Allowances and items with mandated costs such as per diem do not have overhead and profit applied. Prime Contractor Overhead and Profit Items previously developed by Anchor QEA (2010) already include contractor markups, therefore overhead and profit were not applied to those items. It is assumed that OH is 1% and profit is 0% for vendor quotes for treatment and disposal at offsite disposal facilities. It is assumed that OH is 5% and profit is 0% for quotes for all other material vendor quotes.																	

## TABLE CW-D25

Alternative D Cost Worksheet: CW-D25

## Capital Cost Sub-Element

## Long-Term Maintenance for Capping, EMNR, and In Situ Treatment

## COST WORKSHEET

Site: Portland Harbor Superfund Site  
 Location: Portland, Oregon  
 Phase: Draft Feasibility Study  
 Base Year: 2015

Prepared By: AB Date: 8/11/2015

Checked By: JN Date: 8/12/2015

## Work Statement:

This sub-element involves replacement of 5% of the technology assignment layers as part of long-term maintenance. It includes costs for on-site labor, equipment, and materials developed from previous work.

## Cost Analysis:

Cost for Long-Term Maintenance (Lump Sum)

COST DATABASE CODE	DESCRIPTION	QTY	UNIT(S)	HPF	LABOR	ADJ LABOR	EQUIP	ADJ EQUIP	MATL	OTHER	UNMOD UC	UNMOD LIC	PC OH	PC PF	BUR LIC	COST SOURCE CITATION	COMMENTS
	<b>Mobilization / Demobilization</b>																
M16	Mobilization/Demobilization for Long Term Maintenance	1	LS	1.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$98,609.24	\$98,609.24	\$98,609.24	0%	0%	\$98,609	A Previous Work	Assumes 1.6% of total capital costs per Lower Duwamish. See Calculations for derivation.
	<b>Sand Placement for Technology Assignments</b>																
	<b>Sand Placement (Riverbanks)</b>																
P2	Sand Placement (Confined)	2,129	LCY	1.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$49.01	\$49.01	\$104,331.65	0%	0%	\$104,332	P Previous Work	Assume 5% of placement of additional material
M1	Sand	2,129	LCY	1.00	\$0.00	\$0.00	\$0.00	\$0.00	\$19.71	\$0.00	\$19.71	\$41,962.59	0%	0%	\$41,963	P Previous Work	Assume 5% of placement of additional material
	<b>Sand Placement (Confined)</b>																
P2	Sand Placement (Confined)	3,077	LCY	1.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$49.01	\$49.01	\$150,788.39	0%	0%	\$150,788	P Previous Work	Assume 5% of placement of additional material
M1	Sand	3,077	LCY	1.00	\$0.00	\$0.00	\$0.00	\$0.00	\$19.71	\$0.00	\$19.71	\$60,647.67	0%	0%	\$60,648	P Previous Work	Assume 5% of placement of additional material
	<b>Sand Placement (Open Water)</b>																
P6	Sand Placement (Open Water)	20,056	LCY	1.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$23.76	\$23.76	\$476,530.56	0%	0%	\$476,531	P Previous Work	Assume 5% of placement of additional material
M1	Sand	20,056	LCY	1.00	\$0.00	\$0.00	\$0.00	\$0.00	\$19.71	\$0.00	\$19.71	\$395,303.76	0%	0%	\$395,304	P Previous Work	Assume 5% of placement of additional material
	<b>Beach Mix Placement for Technology Assignments</b>																
	<b>Beach Mix Placement (Riverbanks)</b>																
P5	Beach Mix Placement (Confined)	399	LCY	1.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$58.50	\$58.50	\$23,341.50	0%	0%	\$23,342	P Previous Work	Assume 5% of placement of additional material
M5	ODOT 100 Beach Mix	399	LCY	1.00	\$0.00	\$0.00	\$0.00	\$0.00	\$57.59	\$0.00	\$57.59	\$22,978.41	0%	0%	\$22,978	P Previous Work	Assume 5% of placement of additional material
	<b>Beach Mix Placement (Confined)</b>																
P5	Beach Mix Placement (Confined)	99	LCY	1.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$58.50	\$58.50	\$5,791.50	0%	0%	\$5,792	P Previous Work	Assume 5% of placement of additional material
M5	ODOT 100 Beach Mix	99	LCY	1.00	\$0.00	\$0.00	\$0.00	\$0.00	\$57.59	\$0.00	\$57.59	\$5,701.41	0%	0%	\$5,701	P Previous Work	Assume 5% of placement of additional material
	<b>Beach Mix Placement (Open Water)</b>																
P39	Beach Mix Placement (Open Water)	748	LCY	1.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$28.34	\$28.34	\$21,197.39	0%	0%	\$21,197	P Previous Work	Assume 5% of placement of additional material
M5	ODOT 100 Beach Mix	748	LCY	1.00	\$0.00	\$0.00	\$0.00	\$0.00	\$57.59	\$0.00	\$57.59	\$43,077.32	0%	0%	\$43,077	P Previous Work	Assume 5% of placement of additional material
	<b>Armor Placement for Technology Assignments</b>																
	<b>Armor Placement (Riverbanks)</b>																
P3	ODOT 200 Placement (Confined)	282	LCY	1.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$58.50	\$58.50	\$16,497.00	0%	0%	\$16,497	P Previous Work	Assume 5% of placement of additional material
M2	ODOT 200 Armor	282	LCY	1.00	\$0.00	\$0.00	\$0.00	\$0.00	\$57.59	\$0.00	\$57.59	\$16,240.38	0%	0%	\$16,240	P Previous Work	Assume 5% of placement of additional material
	<b>Armor Placement (Confined)</b>																
P3	ODOT 200 Placement (Confined)	683	LCY	1.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$58.50	\$58.50	\$39,955.50	0%	0%	\$39,956	P Previous Work	Assume 5% of placement of additional material
M2	ODOT 200 Armor	683	LCY	1.00	\$0.00	\$0.00	\$0.00	\$0.00	\$57.59	\$0.00	\$57.59	\$39,333.97	0%	0%	\$39,334	P Previous Work	Assume 5% of placement of additional material
	<b>Armor Placement (Open Water)</b>																
P7	ODOT 200 Placement (Open Water)	1,230	LCY	1.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$28.34	\$28.34	\$34,856.66	0%	0%	\$34,857	P Previous Work	Assume 5% of placement of additional material
M2	ODOT 200 Armor	1,230	LCY	1.00	\$0.00	\$0.00	\$0.00	\$0.00	\$57.59	\$0.00	\$57.59	\$70,835.70	0%	0%	\$70,836	P Previous Work	Assume 5% of placement of additional material
	<b>Reactive/GAC Placement for Technology Assignments</b>																
	<b>Reactive/GAC Placement (Riverbanks)</b>																
P40	Carbon (AquaGate + PAC 5%) Placement (Confined)	36	TON	1.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$816.75	\$816.75	\$29,403.00	0%	0%	\$29,403	P Previous Work	Assume 5% of placement of additional material
M4	Carbon (AquaGate + PAC 5%)	36	TON	1.00	\$0.00	\$0.00	\$0.00	\$0.00	\$8,000.00	\$0.00	\$8,000.00	\$288,000.00	5%	0%	\$302,400	V Vendor Quote	Assume 5% of placement of additional material
	<b>Reactive/GAC Placement (Confined)</b>																
P40	Carbon (AquaGate + PAC 5%) Placement (Confined)	47	TON	1.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$816.75	\$816.75	\$38,387.25	0%	0%	\$38,387	P Previous Work	Assume 5% of placement of additional material
M4	Carbon (AquaGate + PAC 5%)	47	TON	1.00	\$0.00	\$0.00	\$0.00	\$0.00	\$8,000.00	\$0.00	\$8,000.00	\$376,000.00	5%	0%	\$394,800	V Vendor Quote	Assume 5% of placement of additional material
	<b>Reactive/GAC Placement (Open Water)</b>																
P41	Carbon (AquaGate + PAC 5%) Placement (Open Water)	386	TON	1.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$396.00	\$396.00	\$152,856.00	0%	0%	\$152,856	P Previous Work	Assume 5% of placement of additional material
M4	Carbon (AquaGate + PAC 5%)	386	TON	1.00	\$0.00	\$0.00	\$0.00	\$0.00	\$8,000.00	\$0.00	\$8,000.00	\$3,088,000.00	5%	0%	\$3,242,400	V Vendor Quote	Assume 5% of placement of additional material

TABLE CW-D25

Alternative D Cost Worksheet: CW-D25

## Capital Cost Sub-Element

## Long-Term Maintenance for Capping, EMNR, and In Situ Treatment

## COST WORKSHEET

Site: Portland Harbor Superfund Site  
 Location: Portland, Oregon  
 Phase: Draft Feasibility Study  
 Base Year: 2015

Prepared By: AB Date: 8/11/2015

Checked By: JN Date: 8/12/2015

## Work Statement:

This sub-element involves replacement of 5% of the technology assignment layers as part of long-term maintenance. It includes costs for on-site labor, equipment, and materials developed from previous work.

## Cost Analysis:

Cost for Long-Term Maintenance (Lump Sum)

COST DATABASE CODE	DESCRIPTION	QTY	UNIT(S)	HPF	LABOR	ADJ LABOR	EQUIP	ADJ EQUIP	MATL	OTHER	UNMOD UC	UNMOD LIC	PC OH	PC PF	BUR LIC	COST SOURCE CITATION	COMMENTS
<b>Geofabric for Riverbanks</b>																	
P51	Geotextile Installation	0.7	AC	1.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$7,060.20	\$7,060.20	\$4,942.14	8%	9%	\$5,818	P Previous Work	
M13	Geotextile	0.7	AC	1.00	\$0.00	\$0.00	\$0.00	\$0.00	\$5,687.39	\$0.00	\$5,687.39	\$3,981.17	5%	0%	\$4,180	V Vendor Quote	Assume 5% of placement of additional material
<b>Organoclay Mat Placement for Technology Assignments</b>																	
<b>Organoclay Mat Placement (Riverbanks)</b>																	
P23	(Confined)	1,960	SF	1.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$23.74	\$23.74	\$46,525.50	0%	0%	\$46,526	P Previous Work	Assume 5% of placement of additional material
<b>Organoclay Mat Placement (Confined)</b>																	
P23	(Confined)	6,970	SF	1.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$23.74	\$23.74	\$165,450.38	0%	0%	\$165,450	P Previous Work	Assume 5% of placement of additional material
<b>Organoclay Mat Placement (Open Water)</b>																	
P24	Organoclay Mat Material and Placement (Open)	29,839	SF	1.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$7.09	\$7.09	\$211,483.91	0%	0%	\$211,484	P Previous Work	Assume 5% of placement of additional material
<b>TOTAL UNIT COST:</b>															<b>\$6,261,686</b>		

## Notes:

HTRW productivity factor is from Exhibit B-3 or B-4 of "A Guide to Developing and Documenting Cost Estimates During the Feasibility Study", EPA 2000

The Cost Database Code is a reference code for linking with line item cost information with the cost source database and is not otherwise used within these cost worksheets.

## Source of Cost Data:

NA Not Applicable - costs are from previous work or vendor quote

For citation references, the following sources apply:

MII (MII Assemblies), GSA (www.gsa.gov), FLC (www.flcdatcenter.com), A (Allowance), V (Vendor Quote), CW (Means CostWorks 2015), P (Previous Work), and FRTR (www.frtr.gov)

## Cost Adjustment Checklist:

FACTOR:  
 H&S Productivity (labor and equipment only)  
 Escalation to Base Year  
 Area Cost Factor  
 Subcontractor Overhead and Profit  
 Prime Contractor Overhead and Profit

## NOTES:

Field work will be in Level "D" PPE.

MII assembly costs include HPF adjustments.

2015 cost sources are not escalated (EF=1.00). All other costs are escalated based on the USACE CWCCIS, EM 1110-2-1304, Mar 2015.

An AF of 1.05 is used for Oregon, except that an AF of 1.00 (national unmodified average) is used for MII assembly costs and local vendor quotes.

It is assumed that home office OH is 8% and profit is 9% for the Prime Contractor. Professional labor overhead is 100%. Allowances and items with mandated costs such as per diem do not have overhead and profit applied.

Items previously developed by Anchor QEA (2010) already include contractor markups, therefore overhead and profit were not applied to those items.

It is assumed that OH is 1% and profit is 0% for vendor quotes for treatment and disposal at offsite disposal facilities. It is assumed that OH is 5% and profit is 0% for quotes for all other material vendor quotes.

## Abbreviations:

QTY	Quantity	ACR	Acre
EQUIP	Equipment	BCY	Bank Cubic Yard
MATL	Material	CLF	100 Linear Foot
HPF	HTRW Productivity Factor	DY	Days
ADJ LABOR	Adjusted Labor for HFP	EA	Each
ADJ EQUIP	Adjusted Equipment for HFP	LF	Linear Foot
UNMOD UC	Unmodified Unit Cost	HR	Hours
UNMOD LIC	Unmodified Line Item Cost	LB	Pounds
UNBUR LIC	Unburdened Line Item Cost	LCY	Loose Cubic Yard
PC OH	Prime Contractor Overhead	LS	Lump Sum
PC PF	Prime Contractor Profit	RL	Roll
BUR LIC	Burdened Line Item Cost	SY	Square Yard
		TN	Tons

TABLE CW-D26

Alternative D																	Cost Worksheet: CW-D26		COST WORKSHEET	
Capital Cost Sub-Element																				
5-Year Site Review																				
Site: Portland Harbor Superfund Site																	Prepared By: JN		Date: 7/27/2015	
Location: Portland, Oregon																				
Phase: Draft Feasibility Study																	Checked By: AS		Date: 7/28/2015	
Base Year: 2015																				
Work Statement:																				
This sub-element involves the site visit and 5-year site review report. The following cost includes labor, material and shipping costs for site visits and 5-year site review reports.																				
Cost Analysis:																				
Cost for 5-Year Site Review (Lump Sum)																				
COST DATABASE CODE	DESCRIPTION	QTY	UNIT(S)	HPF	LABOR	ADJ LABOR	EQUIP	ADJ EQUIP	MATL	OTHER	UNMOD UC	UNMOD LIC	PC OH	PC PF	BUR LIC	COST SOURCE CITATION	COMMENTS			
L11	Project Manager	300	HR	1.00	\$82.17	\$82.17	\$0.00	\$0.00	\$0.00	\$0.00	\$82.17	\$24,651.00	100%	9%	\$53,739	FLC FLCDataCenter				
L4	Environmental Engineer	600	HR	1.00	\$48.91	\$48.91	\$0.00	\$0.00	\$0.00	\$0.00	\$48.91	\$29,346.00	100%	9%	\$63,974	FLC FLCDataCenter				
L6	Environmental Scientist	900	HR	1.00	\$37.70	\$37.70	\$0.00	\$0.00	\$0.00	\$0.00	\$37.70	\$33,930.00	100%	9%	\$73,967	FLC FLCDataCenter				
L12	Quality Control Engineer	120	HR	1.00	\$64.99	\$64.99	\$0.00	\$0.00	\$0.00	\$0.00	\$64.99	\$7,798.80	100%	9%	\$17,001	FLC FLCDataCenter				
L1	CAD Drafter	300	HR	1.00	\$31.31	\$31.31	\$0.00	\$0.00	\$0.00	\$0.00	\$31.31	\$9,393.00	100%	9%	\$20,477	FLC FLCDataCenter				
L3	Clerks, Typist, Bookkeeper & Receptionist	300	HR	1.00	\$19.89	\$19.89	\$0.00	\$0.00	\$0.00	\$0.00	\$19.89	\$5,967.00	100%	9%	\$13,008	FLC FLCDataCenter				
M14	Copy and Shipping Allowance	1	LS	1.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$1,500.00	\$1,500.00	\$1,500.00	0%	0%	\$1,500	A Allowance				
TOTAL UNIT COST:															\$243,666					
Notes:																				
HTRW productivity factor is from Exhibit B-3 or B-4 of "A Guide to Developing and Documenting Cost Estimates During the Feasibility Study", EPA 2000																				
The Cost Database Code is a reference code for linking with line item cost information with the cost source database and is not otherwise used within these cost worksheets.																				
Source of Cost Data:																				
NA Not Applicable - costs are from previous work or vendor quote																				
For citation references, the following sources apply:																				
MII (MII Assemblies), GSA (www.gsa.gov), FLC (www.flcdatacenter.com), A (Allowance), V (Vendor Quote), CW (Means CostWorks 2015), P (Previous Work), and FRTR (www.ftrr.gov)																				
Cost Adjustment Checklist:																				
FACTOR:																				
H&S Productivity (labor and equipment only)																				
Escalation to Base Year																				
Area Cost Factor																				
Subcontractor Overhead and Profit																				
Prime Contractor Overhead and Profit																				
NOTES:																				
Field work will be in Level "D" PPE.																				
MII assembly costs include HPF adjustments.																				
2015 cost sources are not escalated (EF=1.00). All other costs are escalated based on the USACE CWCCIS, EM 1110-2-1304, Mar 2015.																				
An AF of 1.05 is used for Oregon, except that an AF of 1.00 (national unmodified average) is used for MII assembly costs and local vendor quotes.																				
It is assumed that home office OH is 8% and profit is 9% for the Prime Contractor. Professional labor overhead is 100%. Allowances and items with mandated costs such as per diem do not have overhead and profit applied.																				
Items previously developed by Anchor QEA (2010) already include contractor markups, therefore overhead and profit were not applied to those items.																				
It is assumed that OH is 1% and profit is 0% for vendor quotes for treatment and disposal at offsite disposal facilities. It is assumed that OH is 5% and profit is 0% for quotes for all other material vendor quotes.																				
Abbreviations:																				
QTY Quantity																				
EQUIP Equipment																				
MATL Material																				
HPF HTRW Productivity Factor																				
ADJ LABOR Adjusted Labor for HFP																				
ADJ EQUIP Adjusted Equipment for HFP																				
UNMOD UC Unmodified Unit Cost																				
UNMOD LIC Unmodified Line Item Cost																				
UNBUR LIC Unburdened Line Item Cost																				
PC OH Prime Contractor Overhead																				
PC PF Prime Contractor Profit																				
BUR LIC Burdened Line Item Cost																				
ACR Acres																				
BCY Bank Cubic Yard																				
CLF 100 Linear Foot																				
DY Days																				
EA Each																				
LF Linear Foot																				
HR Hours																				
LB Pounds																				
LCY Loose Cubic Yard																				
LS Lump Sum																				
RL Roll																				
SY Square Yard																				
TN Tons																				

**Cost Worksheets**  
**Alternative E**

TABLE CW-E1

<div style="display: flex; justify-content: space-between;"> <span>Alternative E</span> <span>Cost Worksheet: CW-E1</span> </div> <div style="display: flex; justify-content: space-between; margin-top: 5px;"> <span>Capital Cost Sub-Element</span> <span><b>COST WORKSHEET</b></span> </div> <div style="display: flex; justify-content: space-between; margin-top: 5px;"> <span>Mobilization / Demobilization</span> </div>																																																																						
<b>Site:</b> Portland Harbor Superfund Site <b>Location:</b> Portland, Oregon <b>Phase:</b> Draft Feasibility Study <b>Base Year:</b> 2015												<b>Prepared By:</b> AB  <b>Checked By:</b> JN		<b>Date:</b> 8/11/2015  <b>Date:</b> 8/12/2015																																																								
<b>Work Statement:</b> This sub-element involves mobilization and demobilization of all the required equipment to and from the site respectively.																																																																						
<b>Cost Analysis:</b> Cost for Mobilization/Demobilization (Lump Sum)																																																																						
COST DATABASE CODE	DESCRIPTION	QTY	UNIT(S)	HPF	LABOR	ADJ LABOR	EQUIP	ADJ EQUIP	MATL	OTHER	UNMOD UC	UNMOD LIC	PC OH	PC PF	BUR LIC	COST SOURCE CITATION	COMMENTS																																																					
M15	Mobilization/Demobilization	1	LS	1.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$17,645,000.00	\$17,645,000.00	\$17,645,000.00	0%	0%	\$17,645,000	A Previous Work	Assumes 1.6% of total capital costs per Lower Duwamish. See Calculations for derivation.																																																					
												TOTAL UNIT COST:		\$17,645,000																																																								
<div style="display: flex; justify-content: space-between;"> <div style="width: 60%;"> <b>Notes:</b>            HTRW productivity factor is from Exhibit B-3 or B-4 of "A Guide to Developing and Documenting Cost Estimates During the Feasibility Study", EPA 2000            The Cost Database Code is a reference code for linking with line item cost information with the cost source database and is not otherwise used within these cost worksheets.         </div> <div style="width: 35%;"> <b>Abbreviations:</b>  <table style="width: 100%; font-size: small;"> <tr><td>QTY</td><td>Quantity</td><td>ACR</td><td>Acres</td></tr> <tr><td>EQUIP</td><td>Equipment</td><td>BCY</td><td>Bank Cubic Yard</td></tr> <tr><td>MATL</td><td>Material</td><td>CLF</td><td>100 Linear Foot</td></tr> <tr><td>HPF</td><td>HTRW Productivity Factor</td><td>DY</td><td>Days</td></tr> <tr><td>ADJ LABOR</td><td>Adjusted Labor for HFP</td><td>EA</td><td>Each</td></tr> <tr><td>ADJ EQUIP</td><td>Adjusted Equipment for HFP</td><td>LF</td><td>Linear Foot</td></tr> <tr><td>UNMOD UC</td><td>Unmodified Unit Cost</td><td>HR</td><td>Hours</td></tr> <tr><td>UNMOD LIC</td><td>Unmodified Line Item Cost</td><td>LB</td><td>Pounds</td></tr> <tr><td>UNBUR LIC</td><td>Unburdened Line Item Cost</td><td>LCY</td><td>Loose Cubic Yard</td></tr> <tr><td>PC OH</td><td>Prime Contractor Overhead</td><td>LS</td><td>Lump Sum</td></tr> <tr><td>PC PF</td><td>Prime Contractor Profit</td><td>RL</td><td>Roll</td></tr> <tr><td>BUR LIC</td><td>Burdened Line Item Cost</td><td>SY</td><td>Square Yard</td></tr> <tr><td></td><td></td><td>TN</td><td>Tons</td></tr> </table> </div> </div> <div style="margin-top: 10px;"> <b>Source of Cost Data:</b>            NA Not Applicable - costs are from previous work or vendor quote            For citation references, the following sources apply:            MII (MII Assemblies), GSA (www.gsa.gov), FLC (www.flcdatcenter.com), A (Allowance), V (Vendor Quote), CW (Means CostWorks 2015), P (Previous Work), and FRTR (www.frtr.gov)         </div> <div style="margin-top: 10px;"> <table style="width: 100%; font-size: x-small;"> <tr> <td style="width: 33%; vertical-align: top;"> <b>Cost Adjustment Checklist:</b>            FACTOR:            H&amp;S Productivity (labor and equipment only)            Escalation to Base Year            Area Cost Factor            Subcontractor Overhead and Profit            Prime Contractor Overhead and Profit         </td> <td style="width: 67%; vertical-align: top;"> <b>NOTES:</b>            Field work will be in Level "D" PPE.            MII assembly costs include HPF adjustments.            2015 cost sources are not escalated (EF=1.00). All other costs are escalated based on the USACE CWCCIS, EM 1110-2-1304, Mar 2015.            An AF of 1.05 is used for Oregon, except that an AF of 1.00 (national unmodified average) is used for MII assembly costs and local vendor quotes.            It is assumed that home office OH is 8% and profit is 9% for the Prime Contractor. Professional labor overhead is 100%. Allowances and items with mandated costs such as per diem do not have overhead and profit applied.            Items previously developed by Anchor QEA (2010) already include contractor markups, therefore overhead and profit were not applied to those items.            It is assumed that OH is 1% and profit is 0% for vendor quotes for treatment and disposal at offsite disposal facilities. It is assumed that OH is 5% and profit is 0% for quotes for all other material vendor quotes.         </td> </tr> </table> </div>																	QTY	Quantity	ACR	Acres	EQUIP	Equipment	BCY	Bank Cubic Yard	MATL	Material	CLF	100 Linear Foot	HPF	HTRW Productivity Factor	DY	Days	ADJ LABOR	Adjusted Labor for HFP	EA	Each	ADJ EQUIP	Adjusted Equipment for HFP	LF	Linear Foot	UNMOD UC	Unmodified Unit Cost	HR	Hours	UNMOD LIC	Unmodified Line Item Cost	LB	Pounds	UNBUR LIC	Unburdened Line Item Cost	LCY	Loose Cubic Yard	PC OH	Prime Contractor Overhead	LS	Lump Sum	PC PF	Prime Contractor Profit	RL	Roll	BUR LIC	Burdened Line Item Cost	SY	Square Yard			TN	Tons	<b>Cost Adjustment Checklist:</b> FACTOR: H&S Productivity (labor and equipment only) Escalation to Base Year Area Cost Factor Subcontractor Overhead and Profit Prime Contractor Overhead and Profit	<b>NOTES:</b> Field work will be in Level "D" PPE. MII assembly costs include HPF adjustments. 2015 cost sources are not escalated (EF=1.00). All other costs are escalated based on the USACE CWCCIS, EM 1110-2-1304, Mar 2015. An AF of 1.05 is used for Oregon, except that an AF of 1.00 (national unmodified average) is used for MII assembly costs and local vendor quotes. It is assumed that home office OH is 8% and profit is 9% for the Prime Contractor. Professional labor overhead is 100%. Allowances and items with mandated costs such as per diem do not have overhead and profit applied. Items previously developed by Anchor QEA (2010) already include contractor markups, therefore overhead and profit were not applied to those items. It is assumed that OH is 1% and profit is 0% for vendor quotes for treatment and disposal at offsite disposal facilities. It is assumed that OH is 5% and profit is 0% for quotes for all other material vendor quotes.
QTY	Quantity	ACR	Acres																																																																			
EQUIP	Equipment	BCY	Bank Cubic Yard																																																																			
MATL	Material	CLF	100 Linear Foot																																																																			
HPF	HTRW Productivity Factor	DY	Days																																																																			
ADJ LABOR	Adjusted Labor for HFP	EA	Each																																																																			
ADJ EQUIP	Adjusted Equipment for HFP	LF	Linear Foot																																																																			
UNMOD UC	Unmodified Unit Cost	HR	Hours																																																																			
UNMOD LIC	Unmodified Line Item Cost	LB	Pounds																																																																			
UNBUR LIC	Unburdened Line Item Cost	LCY	Loose Cubic Yard																																																																			
PC OH	Prime Contractor Overhead	LS	Lump Sum																																																																			
PC PF	Prime Contractor Profit	RL	Roll																																																																			
BUR LIC	Burdened Line Item Cost	SY	Square Yard																																																																			
		TN	Tons																																																																			
<b>Cost Adjustment Checklist:</b> FACTOR: H&S Productivity (labor and equipment only) Escalation to Base Year Area Cost Factor Subcontractor Overhead and Profit Prime Contractor Overhead and Profit	<b>NOTES:</b> Field work will be in Level "D" PPE. MII assembly costs include HPF adjustments. 2015 cost sources are not escalated (EF=1.00). All other costs are escalated based on the USACE CWCCIS, EM 1110-2-1304, Mar 2015. An AF of 1.05 is used for Oregon, except that an AF of 1.00 (national unmodified average) is used for MII assembly costs and local vendor quotes. It is assumed that home office OH is 8% and profit is 9% for the Prime Contractor. Professional labor overhead is 100%. Allowances and items with mandated costs such as per diem do not have overhead and profit applied. Items previously developed by Anchor QEA (2010) already include contractor markups, therefore overhead and profit were not applied to those items. It is assumed that OH is 1% and profit is 0% for vendor quotes for treatment and disposal at offsite disposal facilities. It is assumed that OH is 5% and profit is 0% for quotes for all other material vendor quotes.																																																																					

TABLE CW-E2

**Alternative E**  
**Capital Cost Sub-Element**  
**Institutional Controls**

**Cost Worksheet: CW-E2**

**COST WORKSHEET**

**Site:** Portland Harbor Superfund Site  
**Location:** Portland, Oregon  
**Phase:** Draft Feasibility Study  
**Base Year:** 2015

**Prepared By:** JN **Date:** 7/27/2015

**Checked By:** AS **Date:** 7/28/2015

**Work Statement:**

This sub-element involves implementation of institutional controls for the site. The following cost includes labor and materials to develop legal documents for institutional controls and cost for document submission and recording.

**Cost Analysis:**

Cost for Institutional Controls (Lump Sum)

COST DATABASE CODE	DESCRIPTION	QTY	UNIT(S)	HPF	LABOR	ADJ LABOR	EQUIP	ADJ EQUIP	MATL	OTHER	UNMOD UC	UNMOD LIC	PC OH	PC PF	BUR LIC	COST SOURCE CITATION	COMMENTS
	<b>Informational Devices - Fish Consumption Advisory</b>																
L11	Project Manager	800	HR	1.00	\$82.17	\$82.17	\$0.00	\$0.00	\$0.00	\$0.00	\$82.17	\$65,736.00	100%	9%	\$143,304	FLC FLCDataCenter	
L4	Environmental Engineer	500	HR	1.00	\$48.91	\$48.91	\$0.00	\$0.00	\$0.00	\$0.00	\$48.91	\$24,455.00	100%	9%	\$53,312	FLC FLCDataCenter	
L6	Environmental Scientist	800	HR	1.00	\$37.70	\$37.70	\$0.00	\$0.00	\$0.00	\$0.00	\$37.70	\$30,160.00	100%	9%	\$65,749	FLC FLCDataCenter	
L3	Clerks, Typist, Bookkeeper & Receptionist	300	HR	1.00	\$19.89	\$19.89	\$0.00	\$0.00	\$0.00	\$0.00	\$19.89	\$5,967.00	100%	9%	\$13,008	FLC FLCDataCenter	
L5	Environmental Lawyer	150	HR	1.00	\$71.72	\$71.72	\$0.00	\$0.00	\$0.00	\$0.00	\$71.72	\$10,758.00	100%	9%	\$23,452	FLC FLCDataCenter	
L13	Paralegal	300	HR	1.00	\$29.56	\$29.56	\$0.00	\$0.00	\$0.00	\$0.00	\$29.56	\$8,868.00	100%	9%	\$19,332	FLC FLCDataCenter	
	<b>Informational Devices - Regulated Navigation Area (RNA) Setup</b>																
L11	Project Manager	150	HR	1.00	\$82.17	\$82.17	\$0.00	\$0.00	\$0.00	\$0.00	\$82.17	\$12,325.50	100%	9%	\$26,870	FLC FLCDataCenter	
L4	Environmental Engineer	100	HR	1.00	\$48.91	\$48.91	\$0.00	\$0.00	\$0.00	\$0.00	\$48.91	\$4,891.00	100%	9%	\$10,662	FLC FLCDataCenter	
L5	Environmental Lawyer	80	HR	2.00	\$71.72	\$35.86	\$0.00	\$0.00	\$0.00	\$0.00	\$35.86	\$2,868.80	100%	9%	\$6,254	FLC FLCDataCenter	
L13	Paralegal	160	HR	1.00	\$29.56	\$29.56	\$0.00	\$0.00	\$0.00	\$0.00	\$29.56	\$4,729.60	100%	9%	\$10,311	FLC FLCDataCenter	
A1	18' Boat	80	HR	1.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$28.02	\$28.02	\$2,241.60	8%	9%	\$2,639	MII MII Assembly	For buoy setup
L17	Boat Operator	80	HR	1.00	\$33.16	\$33.16	\$0.00	\$0.00	\$0.00	\$0.00	\$33.16	\$2,652.80	100%	9%	\$5,783	FLC FLCDataCenter	
L8	Field Technician	80	HR	1.00	\$31.42	\$31.42	\$0.00	\$0.00	\$0.00	\$0.00	\$31.42	\$2,513.60	100%	9%	\$5,480	FLC FLCDataCenter	
M21	Buoy	120	EA	1.00	\$0.00	\$0.00	\$0.00	\$0.00	\$421.76	\$0.00	\$421.76	\$50,611.20	5%	0%	\$53,142	V Vendor Quote	Quote - Go2Marine
	<b>Proprietary Controls</b>																
L5	Environmental Lawyer	200	HR	1.00	\$71.72	\$71.72	\$0.00	\$0.00	\$0.00	\$0.00	\$71.72	\$14,344.00	100%	9%	\$31,270	FLC FLCDataCenter	
L13	Paralegal	250	HR	1.00	\$29.56	\$29.56	\$0.00	\$0.00	\$0.00	\$0.00	\$29.56	\$7,390.00	100%	9%	\$16,110	FLC FLCDataCenter	
L3	Clerks, Typist, Bookkeeper & Receptionist	150	HR	1.00	\$19.89	\$19.89	\$0.00	\$0.00	\$0.00	\$0.00	\$19.89	\$2,983.50	100%	9%	\$6,504	FLC FLCDataCenter	
	<b>Enforcement Tools</b>																
L5	Environmental Lawyer	4,200	HR	1.00	\$71.72	\$71.72	\$0.00	\$0.00	\$0.00	\$0.00	\$71.72	\$301,224.00	100%	9%	\$656,668	FLC FLCDataCenter	
L13	Paralegal	5,250	HR	1.00	\$29.56	\$29.56	\$0.00	\$0.00	\$0.00	\$0.00	\$29.56	\$155,190.00	100%	9%	\$338,314	FLC FLCDataCenter	
L3	Clerks, Typist, Bookkeeper & Receptionist	2,100	HR	1.00	\$19.89	\$19.89	\$0.00	\$0.00	\$0.00	\$0.00	\$19.89	\$41,769.00	100%	9%	\$91,056	FLC FLCDataCenter	
<b>TOTAL UNIT COST:</b>															\$1,579,220		

**Notes:**

HTRW productivity factor is from Exhibit B-3 or B-4 of "A Guide to Developing and Documenting Cost Estimates During the Feasibility Study", EPA 2000

The Cost Database Code is a reference code for linking with line item cost information with the cost source database and is not otherwise used within these cost worksheets.

**Source of Cost Data:**

NA Not Applicable - costs are from previous work or vendor quote

For citation references, the following sources apply:

MII (MII Assemblies), GSA (www.gsa.gov), FLC (www.flcdatacenter.com), A (Allowance), V (Vendor Quote), CW (Means CostWorks 2015), P (Previous Work), and FRTR (www.frtr.gov)

**Cost Adjustment Checklist:**

**FACTOR:**

H&S Productivity (labor and equipment only)

Escalation to Base Year

Area Cost Factor

Subcontractor Overhead and Profit

Prime Contractor Overhead and Profit

**NOTES:**

Field work will be in Level "D" PPE.

MII assembly costs include HPF adjustments.

2015 cost sources are not escalated (EF=1.00). All other costs are escalated based on the USACE CWCCIS, EM 1110-2-1304, Mar 2015.

An AF of 1.05 is used for Oregon, except that an AF of 1.00 (national unmodified average) is used for MII assembly costs and local vendor quotes.

It is assumed that home office OH is 8% and profit is 9% for the Prime Contractor. Professional labor overhead is 100%. Allowances and items with mandated costs such as per diem do not have overhead and profit applied.

Items previously developed by Anchor QEA (2010) already include contractor markups, therefore overhead and profit were not applied to those items.

It is assumed that OH is 1% and profit is 0% for vendor quotes for treatment and disposal at offsite disposal facilities. It is assumed that OH is 5% and profit is 0% for quotes for all other material vendor quotes.

**Abbreviations:**

QTY	Quantity	ACR	Acres
EQUIP	Equipment	BCY	Bank Cubic Yard
MATL	Material	CLF	100 Linear Foot
HPF	HTRW Productivity Factor	DY	Days
ADJ LABOR	Adjusted Labor for HPF	EA	Each
ADJ EQUIP	Adjusted Equipment for HPF	LF	Linear Foot
UNMOD UC	Unmodified Unit Cost	HR	Hours
UNMOD LIC	Unmodified Line Item Cost	LB	Pounds
UNBUR LIC	Unburdened Line Item Cost	LCY	Loose Cubic Yard
PC OH	Prime Contractor Overhead	LS	Lump Sum
PC PF	Prime Contractor Profit	RL	Roll
BUR LIC	Burdened Line Item Cost	SY	Square Yard
		TN	Tons



## TABLE CW-E3

Alternative E	Cost Worksheet:	CW-E3
---------------	-----------------	-------

## Capital Cost Sub-Element COST WORKSHEET

<b>Site:</b>	Portland Harbor Superfund Site	<b>Prepared By:</b>	JN	<b>Date:</b>	7/27/2015
<b>Location:</b>	Portland, Oregon				
<b>Phase:</b>	Draft Feasibility Study	<b>Checked By:</b>	AS	<b>Date:</b>	7/28/2015
<b>Base Year:</b>	2015				

**Work Statement:**

This sub-element involves evaluating and updating of institutional controls for the site. The following cost includes labor and materials to required for evaluating and updating institutional controls every 5 years.

**Cost Analysis:**

Cost for Evaluating and Updating Institutional Controls (Lump Sum)

COST DATABASE CODE	DESCRIPTION	QTY	UNIT(S)	HPF	LABOR	ADJ LABOR	EQUIP	ADJ EQUIP	MATL	OTHER	UNMOD UC	UNMOD LIC	PC OH	PC PF	BUR LIC	COST SOURCE CITATION	COMMENTS
	Informational Devices - Fish Consumption Advisory																
L11	Project Manager	80	HR	1.00	\$82.17	\$82.17	\$0.00	\$0.00	\$0.00	\$0.00	\$82.17	\$6,573.60	100%	9%	\$14,330	FLC FLCDataCenter	Assumes 10% of initial costs for updating periodically
L4	Environmental Engineer	50	HR	1.00	\$48.91	\$48.91	\$0.00	\$0.00	\$0.00	\$0.00	\$48.91	\$2,445.50	100%	9%	\$5,331	FLC FLCDataCenter	Assumes 10% of initial costs for updating periodically
L6	Environmental Scientist	80	HR	1.00	\$37.70	\$37.70	\$0.00	\$0.00	\$0.00	\$0.00	\$37.70	\$3,016.00	100%	9%	\$6,575	FLC FLCDataCenter	Assumes 10% of initial costs for updating periodically
L3	Clerks, Typist, Bookkeeper & Receptionist	30	HR	1.00	\$19.89	\$19.89	\$0.00	\$0.00	\$0.00	\$0.00	\$19.89	\$596.70	100%	9%	\$1,301	FLC FLCDataCenter	Assumes 10% of initial costs for updating periodically
L5	Environmental Lawyer	15	HR	1.00	\$71.72	\$71.72	\$0.00	\$0.00	\$0.00	\$0.00	\$71.72	\$1,075.80	100%	9%	\$2,345	FLC FLCDataCenter	Assumes 10% of initial costs for updating periodically
L13	Paralegal	30	HR	1.00	\$29.56	\$29.56	\$0.00	\$0.00	\$0.00	\$0.00	\$29.56	\$886.80	100%	9%	\$1,933	FLC FLCDataCenter	Assumes 10% of initial costs for updating periodically
	Informational Devices - Regulated Navigation Area (RNA) Setup																
L11	Project Manager	15	HR	1.00	\$82.17	\$82.17	\$0.00	\$0.00	\$0.00	\$0.00	\$82.17	\$1,232.55	100%	9%	\$2,687	FLC FLCDataCenter	Assumes 10% of initial costs for updating periodically
L4	Environmental Engineer	10	HR	1.00	\$48.91	\$48.91	\$0.00	\$0.00	\$0.00	\$0.00	\$48.91	\$489.10	100%	9%	\$1,066	FLC FLCDataCenter	Assumes 10% of initial costs for updating periodically
L5	Environmental Lawyer	8	HR	2.00	\$71.72	\$35.86	\$0.00	\$0.00	\$0.00	\$0.00	\$35.86	\$286.88	100%	9%	\$625	FLC FLCDataCenter	Assumes 10% of initial costs for updating periodically
L13	Paralegal	16	HR	1.00	\$29.56	\$29.56	\$0.00	\$0.00	\$0.00	\$0.00	\$29.56	\$472.96	100%	9%	\$1,031	FLC FLCDataCenter	Assumes 10% of initial costs for updating periodically
A1	18' Boat	80	HR	1.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$28.02	\$28.02	\$2,241.60	8%	9%	\$2,639	MII MII Assembly	For buoy setup
L17	Boat Operator	80	HR	1.00	\$33.16	\$33.16	\$0.00	\$0.00	\$0.00	\$0.00	\$33.16	\$2,652.80	100%	9%	\$5,783	FLC FLCDataCenter	
L8	Field Technician	80	HR	1.00	\$31.42	\$31.42	\$0.00	\$0.00	\$0.00	\$0.00	\$31.42	\$2,513.60	100%	9%	\$5,480	FLC FLCDataCenter	
M21	Buoy	120	EA	1.00	\$0.00	\$0.00	\$0.00	\$0.00	\$421.76	\$0.00	\$421.76	\$50,611.20	5%	0%	\$53,142	V Vendor Quote	Quote - Go2Marine
	Proprietary Controls																
L5	Environmental Lawyer	20	HR	1.00	\$71.72	\$71.72	\$0.00	\$0.00	\$0.00	\$0.00	\$71.72	\$1,434.40	100%	9%	\$3,127	FLC FLCDataCenter	Assumes 10% of initial costs for updating periodically
L13	Paralegal	25	HR	1.00	\$29.56	\$29.56	\$0.00	\$0.00	\$0.00	\$0.00	\$29.56	\$739.00	100%	9%	\$1,611	FLC FLCDataCenter	Assumes 10% of initial costs for updating periodically
L3	Clerks, Typist, Bookkeeper & Receptionist	15	HR	1.00	\$19.89	\$19.89	\$0.00	\$0.00	\$0.00	\$0.00	\$19.89	\$298.35	100%	9%	\$650	FLC FLCDataCenter	Assumes 10% of initial costs for updating periodically
	Enforcement Tools																
L5	Environmental Lawyer	420	HR	1.00	\$71.72	\$71.72	\$0.00	\$0.00	\$0.00	\$0.00	\$71.72	\$30,122.40	100%	9%	\$65,667	FLC FLCDataCenter	Assumes 10% of initial costs for updating periodically
L13	Paralegal	525	HR	1.00	\$29.56	\$29.56	\$0.00	\$0.00	\$0.00	\$0.00	\$29.56	\$15,519.00	100%	9%	\$33,831	FLC FLCDataCenter	Assumes 10% of initial costs for updating periodically
L3	Clerks, Typist, Bookkeeper & Receptionist	210	HR	1.00	\$19.89	\$19.89	\$0.00	\$0.00	\$0.00	\$0.00	\$19.89	\$4,176.90	100%	9%	\$9,106	FLC FLCDataCenter	Assumes 10% of initial costs for updating periodically
												TOTAL UNIT COST:			\$218,260		

Notes: \_\_\_\_\_ Abbreviations: \_\_\_\_\_

HTRW productivity factor is from Exhibit B-3 or B-4 of "A Guide to Developing and Documenting Cost Estimates During the Feasibility Study", EPA 2000	QTY	Quantity	ACR	Acres
--	-----	----------	-----	-------

The Cost Database Code is a reference code for linking with line item cost information with the cost source database and is not otherwise used within these cost worksheets.

Source of Cost Data:	HPF	HTRW Productivity Factor	DY	Days
----------------------	-----	--------------------------	----	------

NA	Not Applicable - costs are from previous work or vendor quote	ADJ LABOR	Adjusted Labor for HFP	EA	Each
----	---	-----------	------------------------	----	------

For citation references, the following sources apply:

MII (MII Assemblies), GSA ([www.gsa.gov](http://www.gsa.gov)), FLC ([www.flcdatadcenter.com](http://www.flcdatadcenter.com)), A (Allowance), V (Vendor Quote), CW (Means CostWorks 2015), P (Previous Work), and FRTR ([www.frtr.gov](http://www.frtr.gov))

Cost Adjustment Checklist:	NOTES:	UNBUR LIC	Unburdened Line Item Cost	LCY	Loose Cubic Yard

FACTOR:	Field work will be in Level "D" PPE.	PC OH	Prime Contractor Overhead	LS	Lump Sum
---------	--------------------------------------	-------	---------------------------	----	----------

H&S Productivity (labor and equipment only)	MII assembly costs include HPF adjustments.	PC PF	Prime Contractor Profit	RL	Roll
---	---	-------	-------------------------	----	------

Escalation to Base Year	2015 cost sources are not escalated (EF=1.00). All other costs are escalated based on the USACE CWCCIS, EM 1110-2-1304, Mar 2015.	BUR LIC	Burdened Line Item Cost	SY	Square Yard
-------------------------	---	---------	-------------------------	----	-------------

Area Cost Factor	An AF of 1.05 is used for Oregon, except that an AF of 1.00 (national unmodified average) is used for MII assembly costs and local vendor quotes.	TN	Tons
------------------	---	----	------

Subcontractor Overhead and Profit It is assumed that home office OH is 8% and profit is 9% for the Prime Contractor. Professional labor overhead is 100%. Allowances and items with mandated costs such as per diem do not have overhead and profit applied.

Prime Contractor Overhead and Profit Items previously developed by Anchor QEA (2010) already include contractor markups, therefore overhead and profit were not applied to those items.

It is assumed that OH is 1% and profit is 0% for vendor quotes for treatment and disposal at offsite disposal facilities. It is assumed that OH is 5% and profit is 0% for quotes for all other material vendor quotes.

NOTES:	UNBUR LIC	Unburdened Line Item Cost	LCY	Loose Cubic Yard
--------	-----------	---------------------------	-----	------------------

Field work will be in Level "D" PPE.	PC OH	Prime Contractor Overhead	LS	Lump Sum
--------------------------------------	-------	---------------------------	----	----------

MII assembly costs include HPF adjustments.

2015 cost sources are not escalated (EF=1.00). All other costs are escalated based on the USACE CWCCIS, EM 1110-2-1304, Mar 2015.

An AF of 1.05 is used for Oregon, except that an AF of 1.00 (national unmodified average) is used for MII assembly costs and local vendor quotes.

It is assumed that home office OH is 8% and profit is 9% for the Prime Contractor. Professional labor overhead is 100%. Allowances and items with mandated costs such as per diem do not have overhead and profit applied.

Items previously developed by Anchor QEA (2010) already include contractor markups, therefore overhead and profit were not applied to those items.

It is assumed that OH is 1% and profit is 0% for vendor quotes for treatment and disposal at offsite disposal facilities. It is assumed that OH is 5% and profit is 0% for quotes for all other material vendor quotes.

**Abbreviations:**

QTY	Quantity	ACR	Acres
EQUIP	Equipment	BCY	Bank Cubic Yard
MATL	Material	CLF	100 Linear Foot
HPF	HTRW Productivity Factor	DY	Days
ADJ LABOR	Adjusted Labor for HFP	EA	Each
ADJ EQUIP	Adjusted Equipment for HFP	LF	Linear Foot
UNMOD UC	Unmodified Unit Cost	HR	Hours
UNMOD LIC	Unmodified Line Item Cost	LB	Pounds
UNBUR LIC	Unburdened Line Item Cost	LCY	Loose Cubic Yard
PC OH	Prime Contractor Overhead	LS	Lump Sum
PC PF	Prime Contractor Profit	RL	Roll
BUR LIC	Burdened Line Item Cost	SY	Square Yard

TABLE CW-E5

TABLE CW-E5																			
<b>Alternative E</b> <b>Capital Cost Sub-Element</b> <b>Debris Removal and Disposal</b>										<b>Cost Worksheet: CW-E5</b>					<b>COST WORKSHEET</b>				
<b>Site:</b> Portland Harbor Superfund Site <b>Location:</b> Portland, Oregon <b>Phase:</b> Draft Feasibility Study <b>Base Year:</b> 2015										<b>Prepared By:</b> JN  <b>Checked By:</b> AS					<b>Date:</b> 7/27/2015  <b>Date:</b> 7/28/2015				
<b>Work Statement:</b> This sub-element involves removal and disposal of debris for all areas prior to remedial activities. It includes costs for on-site labor, equipment, and materials developed from previous work.																			
<b>Cost Analysis:</b> Cost for Debris Removal and Disposal (Lump Sum)																			
COST DATABASE CODE	DESCRIPTION	QTY	UNIT(S)	HPF	LABOR	ADJ LABOR	EQUIP	ADJ EQUIP	MATL	OTHER	UNMOD UC	UNMOD LIC	PC OH	PC PF	BUR LIC	COST SOURCE CITATION	COMMENTS		
P9	Debris Removal and Disposal	329.1	AC	1.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$13,083.75	\$13,083.75	\$4,305,653.07	0%	0%	\$4,305,653	P Previous Work	Developed by Anchor QEA (2010)		
												TOTAL UNIT COST:		\$4,305,653					
<b>Notes:</b> HTRW productivity factor is from Exhibit B-3 or B-4 of "A Guide to Developing and Documenting Cost Estimates During the Feasibility Study", EPA 2000 The Cost Database Code is a reference code for linking with line item cost information with the cost source database and is not otherwise used within these cost worksheets.																			
<b>Source of Cost Data:</b> NA Not Applicable - costs are from previous work or vendor quote For citation references, the following sources apply: MII (MII Assemblies), GSA (www.gsa.gov), FLC (www.flcdatabase.com), A (Allowance), V (Vendor Quote), CW (Means CostWorks 2015), P (Previous Work), and FRTR (www.frtr.gov)										<b>Abbreviations:</b> QTY Quantity EQUIP Equipment MATL Material HPF HTRW Productivity Factor ADJ LABOR Adjusted Labor for HFP ADJ EQUIP Adjusted Equipment for HFP UNMOD UC Unmodified Unit Cost UNMOD LIC Unmodified Line Item Cost UNBUR LIC Unburdened Line Item Cost PC OH Prime Contractor Overhead PC PF Prime Contractor Profit BUR LIC Burdened Line Item Cost									
<b>Cost Adjustment Checklist:</b> FACTOR: H&S Productivity (labor and equipment only) Escalation to Base Year Area Cost Factor Subcontractor Overhead and Profit Prime Contractor Overhead and Profit										<b>NOTES:</b> Field work will be in Level "D" PPE. MII assembly costs include HPF adjustments. 2015 cost sources are not escalated (EF=1.00). All other costs are escalated based on the USACE CWCCIS, EM 1110-2-1304, Mar 2015. An AF of 1.05 is used for Oregon, except that an AF of 1.00 (national unmodified average) is used for MII assembly costs and local vendor quotes. It is assumed that home office OH is 8% and profit is 9% for the Prime Contractor. Professional labor overhead is 100%. Allowances and items with mandated costs such as per diem do not have overhead and profit applied. Items previously developed by Anchor QEA (2010) already include contractor markups, therefore overhead and profit were not applied to those items. It is assumed that OH is 1% and profit is 0% for vendor quotes for treatment and disposal at offsite disposal facilities. It is assumed that OH is 5% and profit is 0% for quotes for all other material vendor quotes.									
										ACR Acres BCY Bank Cubic Yard CLF 100 Linear Foot DY Days EA Each LF Linear Foot HR Hours LB Pounds LCY Loose Cubic Yard LS Lump Sum RL Roll SY Square Yard TN Tons									

TABLE CW-E6

<b>TABLE CW-E6</b>																	
<b>Alternative E</b>		<b>Cost Worksheet: CW-E6</b>															
<b>Capital Cost Sub-Element</b>		<b>COST WORKSHEET</b>															
<b>Obstruction Removal and Relocation</b>																	
<b>Site:</b> Portland Harbor Superfund Site <b>Location:</b> Portland, Oregon <b>Phase:</b> Draft Feasibility Study <b>Base Year:</b> 2015		<b>Prepared By:</b> JN  <b>Checked By:</b> AS										<b>Date:</b> 7/27/2015  <b>Date:</b> 7/28/2015					
<b>Work Statement:</b> This sub-element involves all work related to obstructions removal, relocation, and disposal. It includes all costs for labor, equipment and materials developed from previous work for pile removal and disposal, pile replacement, and temporary dock relocation.																	
<b>Cost Analysis:</b> Cost for Obstructions (Lump Sum)																	
COST DATABASE CODE	DESCRIPTION	QTY	UNIT(S)	HPF	LABOR	ADJ LABOR	EQUIP	ADJ EQUIP	MATL	OTHER	UNMOD UC	UNMOD LIC	PC OH	PC PF	BUR LIC	COST SOURCE CITATION	COMMENTS
P10	Pile Removal and Disposal	1,820	EA	1.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$714.38	\$714.38	\$1,300,162.50	0%	0%	\$1,300,163	P Previous Work	Developed by Anchor QEA (2010)
P11	Pile Replacement	1,820	EA	1.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$7,465.50	\$7,465.50	\$13,587,210.00	0%	0%	\$13,587,210	P Previous Work	Developed by Anchor QEA (2010)
P12	Temporary Dock Relocation	9	EA	1.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$100,319.63	\$100,319.63	\$902,876.63	0%	0%	\$902,877	P Previous Work	Developed by Anchor QEA (2010)
<b>TOTAL UNIT COST:</b>															\$15,790,250		
<b>Notes:</b> HTRW productivity factor is from Exhibit B-3 or B-4 of "A Guide to Developing and Documenting Cost Estimates During the Feasibility Study", EPA 2000 The Cost Database Code is a reference code for linking with line item cost information with the cost source database and is not otherwise used within these cost worksheets.																	
<b>Source of Cost Data:</b> NA Not Applicable - costs are from previous work or vendor quote For citation references, the following sources apply: MII (MII Assemblies), GSA (www.gsa.gov), FLC (www.flcdatcenter.com), A (Allowance), V (Vendor Quote), CW (Means CostWorks 2015), P (Previous Work), and FRTR (www.frtr.gov)																	
<b>Cost Adjustment Checklist:</b> FACTOR: Field work will be in Level "D" PPE. H&S Productivity (labor and equipment only) MII assembly costs include HPF adjustments. Escalation to Base Year 2015 cost sources are not escalated (EF=1.00). All other costs are escalated based on the USACE CWCCIS, EM 1110-2-1304, Mar 2015. Area Cost Factor An AF of 1.05 is used for Oregon, except that an AF of 1.00 (national unmodified average) is used for MII assembly costs and local vendor quotes. Subcontractor Overhead and Profit It is assumed that home office OH is 8% and profit is 9% for the Prime Contractor. Professional labor overhead is 100%. Allowances and items with mandated costs such as per diem do not have overhead and profit applied. Prime Contractor Overhead and Profit Items previously developed by Anchor QEA (2010) already include contractor markups, therefore overhead and profit were not applied to those items. It is assumed that OH is 1% and profit is 0% for vendor quotes for treatment and disposal at offsite disposal facilities. It is assumed that OH is 5% and profit is 0% for quotes for all other material vendor quotes.																	
<b>Abbreviations:</b> QTY Quantity ACR Acres EQUIP Equipment BCY Bank Cubic Yard MATL Material CLF 100 Linear Foot HPF HTRW Productivity Factor DY Days ADJ LABOR Adjusted Labor for HPF EA Each ADJ EQUIP Adjusted Equipment for HPF LF Linear Foot UNMOD UC Unmodified Unit Cost HR Hours UNMOD LIC Unmodified Line Item Cost LB Pounds UNBUR LIC Unburdened Line Item Cost LCY Loose Cubic Yard PC OH Prime Contractor Overhead LS Lump Sum PC PF Prime Contractor Profit RL Roll BUR LIC Burdened Line Item Cost SY Square Yard TN Tons																	

TABLE CW-E7

<b>TABLE CW-E7</b>																	
<b>Alternative E</b>		<b>Cost Worksheet: CW-E7</b>															
<b>Capital Cost Sub-Element</b>		<b>COST WORKSHEET</b>															
<b>Erosion/Residual Control Measures</b>																	
<b>Site:</b>	Portland Harbor Superfund Site										<b>Prepared By:</b>	JN		<b>Date:</b>	7/27/2015		
<b>Location:</b>	Portland, Oregon										<b>Checked By:</b>	AS		<b>Date:</b>	7/28/2015		
<b>Phase:</b>	Draft Feasibility Study																
<b>Base Year:</b>	2015																
<b>Work Statement:</b> This sub-element involves the installation, maintenance, and removal of silt curtains and sheet pile walls for erosion and residual control. It includes costs for on-site labor, equipment, and materials developed from previous work.																	
<b>Cost Analysis:</b> Cost for Erosion/Residual Control Measures (Lump Sum)																	
<b>COST DATABASE CODE</b>	<b>DESCRIPTION</b>	<b>QTY</b>	<b>UNIT(S)</b>	<b>HPF</b>	<b>LABOR</b>	<b>ADJ LABOR</b>	<b>EQUIP</b>	<b>ADJ EQUIP</b>	<b>MATL</b>	<b>OTHER</b>	<b>UNMOD UC</b>	<b>UNMOD LIC</b>	<b>PC OH</b>	<b>PC PF</b>	<b>BUR LIC</b>	<b>COST SOURCE CITATION</b>	<b>COMMENTS</b>
P13	Purchase, Install and Maintain Silt Curtains	45,000	LF	1.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$96.75	\$96.75	\$4,353,750.00	0%	0%	\$4,353,750	P Previous Work	Developed by Anchor QEA (2010)
P14	Purchase, Install and Remove Sheet Pile Walls	7,500	LF	1.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$2,745.00	\$2,745.00	\$20,587,500.00	0%	0%	\$20,587,500	P Previous Work	Developed by Anchor QEA (2010)
<b>TOTAL UNIT COST:</b>															<b>\$24,941,250</b>		
<b>Notes:</b> HTRW productivity factor is from Exhibit B-3 or B-4 of "A Guide to Developing and Documenting Cost Estimates During the Feasibility Study", EPA 2000 The Cost Database Code is a reference code for linking with line item cost information with the cost source database and is not otherwise used within these cost worksheets.																	
<b>Source of Cost Data:</b> NA Not Applicable - costs are from previous work or vendor quote For citation references, the following sources apply: MII (MII Assemblies), GSA (www.gsa.gov), FLC (www.flcdatcenter.com), A (Allowance), V (Vendor Quote), CW (Means CostWorks 2015), P (Previous Work), and FRTR (www.frtr.gov)																	
<b>Cost Adjustment Checklist:</b> FACTOR: H&S Productivity (labor and equipment only) Escalation to Base Year Area Cost Factor Subcontractor Overhead and Profit Prime Contractor Overhead and Profit																	
<b>NOTES:</b> Field work will be in Level "D" PPE. MII assembly costs include HPF adjustments. 2015 cost sources are not escalated (EF=1.00). All other costs are escalated based on the USACE CWCCIS, EM 1110-2-1304, Mar 2015. An AF of 1.05 is used for Oregon, except that an AF of 1.00 (national unmodified average) is used for MII assembly costs and local vendor quotes. It is assumed that home office OH is 8% and profit is 9% for the Prime Contractor. Professional labor overhead is 100%. Allowances and items with mandated costs such as per diem do not have overhead and profit applied. Items previously developed by Anchor QEA (2010) already include contractor markups, therefore overhead and profit were not applied to those items. It is assumed that OH is 1% and profit is 0% for vendor quotes for treatment and disposal at offsite disposal facilities. It is assumed that OH is 5% and profit is 0% for quotes for all other material vendor quotes.																	
<b>Abbreviations:</b> QTY Quantity EQUIP Equipment MATL Material HPF HTRW Productivity Factor ADJ LABOR Adjusted Labor for HFP ADJ EQUIP Adjusted Equipment for HFP UNMOD UC Unmodified Unit Cost UNMOD LIC Unmodified Line Item Cost UNBUR LIC Unburdened Line Item Cost PC OH Prime Contractor Overhead PC PF Prime Contractor Profit BUR LIC Burdened Line Item Cost ACR Acres BCY Bank Cubic Yard CLF 100 Linear Foot DY Days EA Each LF Linear Foot HR Hours LB Pounds LCY Loose Cubic Yard LS Lump Sum RL Roll SY Square Yard TN Tons																	

TABLE CW-E8

TABLE CW-E8																				
<div style="display: flex; justify-content: space-between;"> <div> <b>Alternative E</b>  <b>Capital Cost Sub-Element</b>  <b>Dredging of Contaminated Sediments (Open Water)</b> </div> <div> <b>Cost Worksheet: CW-E8</b> </div> <div style="text-align: right;"> <b>COST WORKSHEET</b> </div> </div>																				
<b>Site:</b> Portland Harbor Superfund Site <b>Location:</b> Portland, Oregon <b>Phase:</b> Draft Feasibility Study <b>Base Year:</b> 2015										<b>Prepared By:</b> JN <b>Checked By:</b> AS <b>Date:</b> 7/27/2015 <b>Date:</b> 7/28/2015										
<b>Work Statement:</b> This sub-element involves mechanical dredging of contaminated sediments in open water areas and transport to offloading area. It includes costs for on-site labor, equipment, and materials developed from previous work.																				
<b>Cost Analysis:</b> Cost for Open Water Dredging (Lump Sum)																				
COST DATABASE CODE	DESCRIPTION	QTY	UNIT(S)	HPF	LABOR	ADJ LABOR	EQUIP	ADJ EQUIP	MATL	OTHER	UNMOD UC	UNMOD LIC	PC OH	PC PF	BUR LIC	COST SOURCE CITATION	COMMENTS			
P15	Open Water Dredging and Transport	2,050,277	CY	1.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$38.03	\$38.03	\$77,961,782.93	0%	0%	\$77,961,783	P Previous Work	Developed by Anchor QEA (2010)			
												<b>TOTAL UNIT COST:</b>		\$77,961,783						
<b>Notes:</b> HTRW productivity factor is from Exhibit B-3 or B-4 of "A Guide to Developing and Documenting Cost Estimates During the Feasibility Study", EPA 2000 The Cost Database Code is a reference code for linking with line item cost information with the cost source database and is not otherwise used within these cost worksheets.															<b>Abbreviations:</b> QTY Quantity EQUIP Equipment MATL Material HPF HTRW Productivity Factor ADJ LABOR Adjusted Labor for HFP ADJ EQUIP Adjusted Equipment for HFP UNMOD UC Unmodified Unit Cost UNMOD LIC Unmodified Line Item Cost UNBUR LIC Unburdened Line Item Cost PC OH Prime Contractor Overhead PC PF Prime Contractor Profit BUR LIC Burdened Line Item Cost			ACR Acres BCY Bank Cubic Yard CLF 100 Linear Foot DY Days EA Each LF Linear Foot HR Hours LB Pounds LCY Loose Cubic Yard LS Lump Sum RL Roll SY Square Yard TN Tons		
<b>Source of Cost Data:</b> NA Not Applicable - costs are from previous work or vendor quote For citation references, the following sources apply: MII (MII Assemblies), GSA (www.gsa.gov), FLC (www.flcdatabase.com), A (Allowance), V (Vendor Quote), CW (Means CostWorks 2015), P (Previous Work), and FRTR (www.frtr.gov)															<b>Cost Adjustment Checklist:</b> FACTOR: H&S Productivity (labor and equipment only) Escalation to Base Year Area Cost Factor Subcontractor Overhead and Profit Prime Contractor Overhead and Profit			<b>NOTES:</b> Field work will be in Level "D" PPE. MII assembly costs include HPF adjustments. 2015 cost sources are not escalated (EF=1.00). All other costs are escalated based on the USACE CWCCIS, EM 1110-2-1304, Mar 2015. An AF of 1.05 is used for Oregon, except that an AF of 1.00 (national unmodified average) is used for MII assembly costs and local vendor quotes. It is assumed that home office OH is 8% and profit is 9% for the Prime Contractor. Professional labor overhead is 100%. Allowances and items with mandated costs such as per diem do not have overhead and profit applied. Items previously developed by Anchor QEA (2010) already include contractor markups, therefore overhead and profit were not applied to those items. It is assumed that OH is 1% and profit is 0% for vendor quotes for treatment and disposal at offsite disposal facilities. It is assumed that OH is 5% and profit is 0% for quotes for all other material vendor quotes.		

TABLE CW-E9

TABLE CW-E9																				
<div style="display: flex; justify-content: space-between;"> <div> <b>Alternative E</b>  <b>Capital Cost Sub-Element</b>  <b>Dredging of Contaminated Sediments (Confined)</b> </div> <div> <b>Cost Worksheet: CW-E9</b> </div> <div style="text-align: right;"> <b style="font-size: 1.2em;">COST WORKSHEET</b> </div> </div>																				
<b>Site:</b> Portland Harbor Superfund Site <b>Location:</b> Portland, Oregon <b>Phase:</b> Draft Feasibility Study <b>Base Year:</b> 2015										<b>Prepared By:</b> JN <b>Checked By:</b> AS <b>Date:</b> 7/27/2015 <b>Date:</b> 7/28/2015										
<b>Work Statement:</b> This sub-element involves mechanical dredging of contaminated sediments in confined areas and transport to offloading area. It includes costs for on-site labor, equipment, and materials developed from previous work.																				
<b>Cost Analysis:</b> Cost for Confined Dredging (Lump Sum)																				
COST DATABASE CODE	DESCRIPTION	QTY	UNIT(S)	HPF	LABOR	ADJ LABOR	EQUIP	ADJ EQUIP	MATL	OTHER	UNMOD UC	UNMOD LIC	PC OH	PC PF	BUR LIC	COST SOURCE CITATION	COMMENTS			
P16	Confined Dredging and Transport	354,680	CY	1.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$53.66	\$53.66	\$19,033,015.50	0%	0%	\$19,033,016	P Previous Work	Developed by Anchor QEA (2010)			
												TOTAL UNIT COST:		\$19,033,016						
<b>Notes:</b> HTRW productivity factor is from Exhibit B-3 or B-4 of "A Guide to Developing and Documenting Cost Estimates During the Feasibility Study", EPA 2000 The Cost Database Code is a reference code for linking with line item cost information with the cost source database and is not otherwise used within these cost worksheets.															<b>Abbreviations:</b> QTY Quantity EQUIP Equipment MATL Material HPF HTRW Productivity Factor ADJ LABOR Adjusted Labor for HFP ADJ EQUIP Adjusted Equipment for HFP UNMOD UC Unmodified Unit Cost UNMOD LIC Unmodified Line Item Cost UNBUR LIC Unburdened Line Item Cost PC OH Prime Contractor Overhead PC PF Prime Contractor Profit BUR LIC Burdened Line Item Cost			ACR Acres BCY Bank Cubic Yard CLF 100 Linear Foot DY Days EA Each LF Linear Foot HR Hours LB Pounds LCY Loose Cubic Yard LS Lump Sum RL Roll SY Square Yard TN Tons		
<b>Source of Cost Data:</b> NA Not Applicable - costs are from previous work or vendor quote For citation references, the following sources apply: MII (MII Assemblies), GSA (www.gsa.gov), FLC (www.flcdatabase.com), A (Allowance), V (Vendor Quote), CW (Means CostWorks 2015), P (Previous Work), and FRTR (www.frtr.gov)															<b>Cost Adjustment Checklist:</b> FACTOR: H&S Productivity (labor and equipment only) Escalation to Base Year Area Cost Factor Subcontractor Overhead and Profit Prime Contractor Overhead and Profit			<b>NOTES:</b> Field work will be in Level "D" PPE. MII assembly costs include HPF adjustments. 2015 cost sources are not escalated (EF=1.00). All other costs are escalated based on the USACE CWCCIS, EM 1110-2-1304, Mar 2015. An AF of 1.05 is used for Oregon, except that an AF of 1.00 (national unmodified average) is used for MII assembly costs and local vendor quotes. It is assumed that home office OH is 8% and profit is 9% for the Prime Contractor. Professional labor overhead is 100%. Allowances and items with mandated costs such as per diem do not have overhead and profit applied. Items previously developed by Anchor QEA (2010) already include contractor markups, therefore overhead and profit were not applied to those items. It is assumed that OH is 1% and profit is 0% for vendor quotes for treatment and disposal at offsite disposal facilities. It is assumed that OH is 5% and profit is 0% for quotes for all other material vendor quotes.		

TABLE CW-E10

TABLE CW-E10																				
<div style="display: flex; justify-content: space-between;"> <div> <b>Alternative E</b>  <b>Capital Cost Sub-Element</b>  <b>Excavation of Contaminated Sediments (From Shore for Riverbanks)</b> </div> <div> <b>Cost Worksheet: CW-E10</b> </div> <div style="text-align: right;"> <b>COST WORKSHEET</b> </div> </div>																				
<b>Site:</b> Portland Harbor Superfund Site <b>Location:</b> Portland, Oregon <b>Phase:</b> Draft Feasibility Study <b>Base Year:</b> 2015										<b>Prepared By:</b> JN <b>Checked By:</b> AS <b>Date:</b> 7/27/2015 <b>Date:</b> 7/28/2015										
<b>Work Statement:</b> This sub-element involves mechanical excavation from the shore of contaminated materials along the riverbanks. It includes costs for on-site labor, equipment, and materials developed from previous work.																				
<b>Cost Analysis:</b> Cost for Excavation from Shore for Riverbanks (Lump Sum)																				
COST DATABASE CODE	DESCRIPTION	QTY	UNIT(S)	HPF	LABOR	ADJ LABOR	EQUIP	ADJ EQUIP	MATL	OTHER	UNMOD UC	UNMOD LIC	PC OH	PC PF	BUR LIC	COST SOURCE CITATION	COMMENTS			
P17	Dredging from Shore	89,212	CY	1.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$46.80	\$46.80	\$4,175,121.60	0%	0%	\$4,175,122	P Previous Work	Developed by Anchor QEA (2010)			
												TOTAL UNIT COST:		\$4,175,122						
<b>Notes:</b> HTRW productivity factor is from Exhibit B-3 or B-4 of "A Guide to Developing and Documenting Cost Estimates During the Feasibility Study", EPA 2000 The Cost Database Code is a reference code for linking with line item cost information with the cost source database and is not otherwise used within these cost worksheets.															<b>Abbreviations:</b> QTY Quantity EQUIP Equipment MATL Material HPF HTRW Productivity Factor ADJ LABOR Adjusted Labor for HFP ADJ EQUIP Adjusted Equipment for HFP UNMOD UC Unmodified Unit Cost UNMOD LIC Unmodified Line Item Cost UNBUR LIC Unburdened Line Item Cost PC OH Prime Contractor Overhead PC PF Prime Contractor Profit BUR LIC Burdened Line Item Cost			ACR Acres BCY Bank Cubic Yard CLF 100 Linear Foot DY Days EA Each LF Linear Foot HR Hours LB Pounds LCY Loose Cubic Yard LS Lump Sum RL Roll SY Square Yard TN Tons		
<b>Source of Cost Data:</b> NA Not Applicable - costs are from previous work or vendor quote For citation references, the following sources apply: MII (MII Assemblies), GSA (www.gsa.gov), FLC (www.flcdatacenter.com), A (Allowance), V (Vendor Quote), CW (Means CostWorks 2015), P (Previous Work), and FRTR (www.frtr.gov)															<b>Cost Adjustment Checklist:</b> FACTOR: H&S Productivity (labor and equipment only) Escalation to Base Year Area Cost Factor Subcontractor Overhead and Profit Prime Contractor Overhead and Profit			<b>NOTES:</b> Field work will be in Level "D" PPE. MII assembly costs include HPF adjustments. 2015 cost sources are not escalated (EF=1.00). All other costs are escalated based on the USACE CWCCIS, EM 1110-2-1304, Mar 2015. An AF of 1.05 is used for Oregon, except that an AF of 1.00 (national unmodified average) is used for MII assembly costs and local vendor quotes. It is assumed that home office OH is 8% and profit is 9% for the Prime Contractor. Professional labor overhead is 100%. Allowances and items with mandated costs such as per diem do not have overhead and profit applied. Items previously developed by Anchor QEA (2010) already include contractor markups, therefore overhead and profit were not applied to those items. It is assumed that OH is 1% and profit is 0% for vendor quotes for treatment and disposal at offsite disposal facilities. It is assumed that OH is 5% and profit is 0% for quotes for all other material vendor quotes.		

TABLE CW-E11

<b>TABLE CW-E11</b>																	
<div style="display: flex; justify-content: space-between;"> <div> <b>Alternative E</b>  <b>Capital Cost Sub-Element</b>  <b>Hydraulic Offloading of the Contaminated Sediments</b> </div> <div> <b>Cost Worksheet: CW-E11</b> </div> <div style="text-align: right;"> <b>COST WORKSHEET</b> </div> </div>																	
<b>Site:</b> Portland Harbor Superfund Site <b>Location:</b> Portland, Oregon <b>Phase:</b> Draft Feasibility Study <b>Base Year:</b> 2015												<b>Prepared By:</b> AB <b>Checked By:</b> JN		<b>Date:</b> 8/11/2015 <b>Date:</b> 8/12/2015			
<b>Work Statement:</b> This sub-element involves the hydraulic offloading of contaminated sediments. The contaminated sediments would be offloaded at the transload facility (for Subtitle C or Subtitle D disposal). It includes costs for on-site labor, equipment, and materials developed from previous work.																	
<b>Cost Analysis:</b> Cost for Hydraulic Offloading (Lump Sum)																	
COST DATABASE CODE	DESCRIPTION	QTY	UNIT(S)	HPF	LABOR	ADJ LABOR	EQUIP	ADJ EQUIP	MATL	OTHER	UNMOD UC	UNMOD LIC	PC OH	PC PF	BUR LIC	COST SOURCE CITATION	COMMENTS
	Hydraulic Offloading for Subtitle C Disposal																
P19	Hydraulic Offloading	387,584	CY	1.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$6.30	\$6.30	\$2,441,779.20	0%	0%	\$2,441,779	P Previous Work	Developed by Anchor QEA (2010)
	Hydraulic Offloading for Subtitle D Disposal																
P19	Hydraulic Offloading	2,106,585	CY	1.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$6.30	\$6.30	\$13,271,485.50	0%	0%	\$13,271,486	P Previous Work	Developed by Anchor QEA (2010)
												<b>TOTAL UNIT COST:</b>		\$15,713,265			
<div style="display: flex; justify-content: space-between;"> <div> <b>Notes:</b>            HTRW productivity factor is from Exhibit B-3 or B-4 of "A Guide to Developing and Documenting Cost Estimates During the Feasibility Study", EPA 2000            The Cost Database Code is a reference code for linking with line item cost information with the cost source database and is not otherwise used within these cost worksheets.         </div> <div> <b>Abbreviations:</b>            QTY Quantity            EQUIP Equipment            MATL Material            HPF HTRW Productivity Factor            ADJ LABOR Adjusted Labor for HFP            ADJ EQUIP Adjusted Equipment for HFP            UNMOD UC Unmodified Unit Cost            UNMOD LIC Unmodified Line Item Cost            UNBUR LIC Unburdened Line Item Cost            PC OH Prime Contractor Overhead            PC PF Prime Contractor Profit            BUR LIC Burdened Line Item Cost         </div> <div>           ACR Acres            BCY Bank Cubic Yard            CLF 100 Linear Foot            DY Days            EA Each            LF Linear Foot            HR Hours            LB Pounds            LCY Loose Cubic Yard            LS Lump Sum            RL Roll            SY Square Yard            TN Tons         </div> </div>																	
<b>Source of Cost Data:</b> NA Not Applicable - costs are from previous work or vendor quote For citation references, the following sources apply: MII (Mill Assemblies), GSA (www.gsa.gov), FLC (www.flcdatabasecenter.com), A (Allowance), V (Vendor Quote), CW (Means CostWorks 2015), P (Previous Work), and FRTR (www.frtr.gov)																	
<div style="display: flex; justify-content: space-between;"> <div> <b>Cost Adjustment Checklist:</b>            FACTOR:            H&amp;S Productivity (labor and equipment only)            Escalation to Base Year            Area Cost Factor            Subcontractor Overhead and Profit            Prime Contractor Overhead and Profit         </div> <div> <b>NOTES:</b>            Field work will be in Level "D" PPE.            MII assembly costs include HPF adjustments.            2015 cost sources are not escalated (EF=1.00). All other costs are escalated based on the USACE CWCCIS, EM 1110-2-1304, Mar 2015.            An AF of 1.05 is used for Oregon, except that an AF of 1.00 (national unmodified average) is used for MII assembly costs and local vendor quotes.            It is assumed that home office OH is 8% and profit is 9% for the Prime Contractor. Professional labor overhead is 100%. Allowances and items with mandated costs such as per diem do not have overhead and profit applied.            Items previously developed by Anchor QEA (2010) already include contractor markups, therefore overhead and profit were not applied to those items.            It is assumed that OH is 1% and profit is 0% for vendor quotes for treatment and disposal at offsite disposal facilities. It is assumed that OH is 5% and profit is 0% for quotes for all other material vendor quotes.         </div> </div>																	



TABLE CW-E12

<div style="display: flex; justify-content: space-between;"> <div> <b>Alternative E</b>  <b>Capital Cost Sub-Element</b>  <b>Subtitle C/TSCA Disposal (Handling, Transportation, Treatment of Select PTW Materials, and Disposal)</b> </div> <div> <b>Cost Worksheet: CW-E12</b> </div> <div style="text-align: right;"> <b>COST WORKSHEET</b> </div> </div>																	
<b>Site:</b> Portland Harbor Superfund Site <b>Location:</b> Portland, Oregon <b>Phase:</b> Draft Feasibility Study <b>Base Year:</b> 2015												<b>Prepared By:</b> AB  <b>Checked By:</b> JN			<b>Date:</b> 8/11/2015  <b>Date:</b> 8/12/2015		
<b>Work Statement:</b> This sub-element involves the disposal of contaminated sediments at a Subtitle C/TSCA landfill, including materials handling from the barge to truck, transportation of the sediments to the Subtitle C/TSCA landfill, and disposal of contaminated sediments (including treatment for a portion of the PTW volume that is NRC/NAPL). It includes costs for on-site labor, equipment, and materials developed from previous work, as well as recent vendor quotes.																	
<b>Cost Analysis:</b> Cost for Subtitle C/TSCA Disposal (Lump Sum)																	
COST DATABASE CODE	DESCRIPTION	QTY	UNIT(S)	HPF	LABOR	ADJ LABOR	EQUIP	ADJ EQUIP	MATL	OTHER	UNMOD UC	UNMOD LIC	PC OH	PC PF	BUR LIC	COST SOURCE CITATION	COMMENTS
	Materials Handling																
P20	Materials Handling from Barge to Upland Stockpile	387,584	CY	1.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$10.46	\$10.46	\$4,055,097.60	0%	0%	\$4,055,098	P Previous Work	Developed by Anchor QEA (2010)
P21	Mix DE with Dredged Material to Improve Handling	90,114	TON	1.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$2.25	\$2.25	\$202,756.50	0%	0%	\$202,757	P Previous Work	Developed by Anchor QEA (2010)
M7	Diatomaceous Earth	90,114	TON	1.00	\$0.00	\$0.00	\$0.00	\$0.00	\$105.75	\$0.00	\$105.75	\$9,529,555.50	0%	0%	\$9,529,556	P Previous Work	Vendor Quote - Waste Management, 2010. Assumes 15% mixing rate.
P22	Materials Handling from Stockpile to Truck/Rail Car	387,584	CY	1.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$8.72	\$8.72	\$3,379,248.00	0%	0%	\$3,379,248	P Previous Work	Developed by Anchor QEA (2010)
	Transportation and Disposal at Subtitle C/TSCA Landfill																
M8	Transportation to Subtitle C/TSCA Landfill	387,584	CY	1.00	\$0.00	\$0.00	\$0.00	\$0.00	\$69.75	\$0.00	\$69.75	\$27,033,984.00	8%	9%	\$31,824,406	V Vendor Quote	Assumes truck transportation. Quote - CWM of the Northwest.
M20	Thermal Desorption Treatment at Subtitle C/TSCA Landfill (Low End of Treatment Cost Range)	193,792	CY	1.00	\$0.00	\$0.00	\$0.00	\$0.00	\$489.00	\$0.00	\$489.00	\$94,764,288.00	1%	0%	\$95,711,931	V Vendor Quote	Quote - CWM of the Northwest
M9	Thermal Desorption Treatment at Subtitle C/TSCA Landfill (High End of Treatment Cost Range)	193,792	CY	1.00	\$0.00	\$0.00	\$0.00	\$0.00	\$875.75	\$0.00	\$875.75	\$169,713,344.00	1%	0%	\$171,410,477	V Vendor Quote	Quote - CWM of the Northwest.
M10	Tipping Fee at Subtitle C/TSCA Landfill	387,584	CY	1.00	\$0.00	\$0.00	\$0.00	\$0.00	\$131.75	\$0.00	\$131.75	\$51,064,192.00	1%	0%	\$51,574,834	V Vendor Quote	Quote - CWM of the Northwest.
<b>TOTAL UNIT COST:</b>															\$367,688,307		
<div style="display: flex; justify-content: space-between;"> <div style="width: 60%;"> <b>Notes:</b>            HTRW productivity factor is from Exhibit B-3 or B-4 of "A Guide to Developing and Documenting Cost Estimates During the Feasibility Study", EPA 2000            The Cost Database Code is a reference code for linking with line item cost information with the cost source database and is not otherwise used within these cost worksheets.         </div> <div style="width: 35%;"> <b>Abbreviations:</b>            QTY Quantity            EQUIP Equipment            MATL Material            HPF HTRW Productivity Factor            ADJ LABOR Adjusted Labor for HPF            ADJ EQUIP Adjusted Equipment for HPF            UNMOD UC Unmodified Unit Cost            UNMOD LIC Unmodified Line Item Cost            UNBUR LIC Unburdened Line Item Cost            PC OH Prime Contractor Overhead            PC PF Prime Contractor Profit            BUR LIC Burdened Line Item Cost         </div> <div style="width: 5%;">           ACR Acres            BCY Bank Cubic Yard            CLF 100 Linear Foot            DY Days            EA Each            LF Linear Foot            HR Hours            LB Pounds            LCY Loose Cubic Yard            LS Lump Sum            RL Roll            SY Square Yard            TN Tons         </div> </div>																	
<div style="display: flex; justify-content: space-between;"> <div style="width: 45%;"> <b>Source of Cost Data:</b>            NA Not Applicable - costs are from previous work or vendor quote            For citation references, the following sources apply:            MII (MII Assemblies), GSA (www.gsa.gov), FLC (www.flcdatcenter.com), A (Allowance), V (Vendor Quote), CW (Means CostWorks 2015), P (Previous Work), and FRTR (www.frtr.gov)         </div> <div style="width: 50%;"> <b>Cost Adjustment Checklist:</b>            FACTOR:            H&amp;S Productivity (labor and equipment only)            Escalation to Base Year            Area Cost Factor            Subcontractor Overhead and Profit            Prime Contractor Overhead and Profit         </div> <div style="width: 45%;"> <b>NOTES:</b>            Field work will be in Level "D" PPE.            MII assembly costs include HPF adjustments.            2015 cost sources are not escalated (EF=1.00). All other costs are escalated based on the USACE CWCCIS, EM 1110-2-1304, Mar 2015.            An AF of 1.05 is used for Oregon, except that an AF of 1.00 (national unmodified average) is used for MII assembly costs and local vendor quotes.            It is assumed that home office OH is 8% and profit is 9% for the Prime Contractor. Professional labor overhead is 100%. Allowances and items with mandated costs such as per diem do not have overhead and profit applied.            Items previously developed by Anchor QEA (2010) already include contractor markups, therefore overhead and profit were not applied to those items.            It is assumed that OH is 1% and profit is 0% for vendor quotes for treatment and disposal at offsite disposal facilities. It is assumed that OH is 5% and profit is 0% for quotes for all other material vendor quotes.         </div> </div>																	

TABLE CW-E13

Alternative E Cost Worksheet: CW-E13

## Capital Cost Sub-Element

## Subtitle D Disposal (Handling, Transportation, and Disposal)

## COST WORKSHEET

Site: Portland Harbor Superfund Site  
 Location: Portland, Oregon  
 Phase: Draft Feasibility Study  
 Base Year: 2015

Prepared By: AB Date: 8/11/2015

Checked By: JN Date: 8/12/2015

## Work Statement:

This sub-element involves the disposal of contaminated sediments at a Subtitle D landfill, including materials handling from the barge to truck, transportation of the sediments to the Subtitle D landfill, and disposal of contaminated sediments. It includes costs for on-site labor, equipment, and materials developed from previous work, as well as recent vendor quotes.

## Cost Analysis:

Cost for Subtitle D Disposal (Lump Sum)

COST DATABASE CODE	DESCRIPTION	QTY	UNIT(S)	HPF	LABOR	ADJ LABOR	EQUIP	ADJ EQUIP	MATL	OTHER	UNMOD UC	UNMOD LIC	PC OH	PC PF	BUR LIC	COST SOURCE CITATION	COMMENTS
	Materials Handling																
P20	Materials Handling from Barge to Upland Stockpile	2,106,585	CY	1.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$10.46	\$10.46	\$22,040,145.56	0%	0%	\$22,040,146	P Previous Work	Developed by Anchor QEA (2010)
P21	Mix DE with Dredged Material to Improve Handling	163,261	TON	1.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$2.25	\$2.25	\$367,337.25	0%	0%	\$367,337	P Previous Work	Developed by Anchor QEA (2010)
M7	Diatomaceous Earth	163,261	TON	1.00	\$0.00	\$0.00	\$0.00	\$0.00	\$105.75	\$0.00	\$105.75	\$17,264,850.75	0%	0%	\$17,264,851	P Previous Work	Vendor Quote - Waste Management, 2010. Assumes 5% mixing rate.
P22	Materials Handling from Stockpile to Truck/Rail Car	2,106,585	CY	1.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$8.72	\$8.72	\$18,366,787.97	0%	0%	\$18,366,788	P Previous Work	Developed by Anchor QEA (2010)
P37	Gondola/Rail Car Mobilization	3,500	EA	1.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$4,500.00	\$4,500.00	\$15,750,000.00	0%	0%	\$15,750,000	P Previous Work	Developed by Anchor QEA (2010)
	Transportation and Disposal at Subtitle D Landfill																
M11	Transportation and Disposal at Subtitle D Landfill	2,106,585	CY	1.00	\$0.00	\$0.00	\$0.00	\$0.00	\$90.68	\$0.00	\$90.68	\$191,025,127.80	1%	0%	\$192,935,379	P Previous Work	Quote - Republic Services (Roosevelt Landfill). Assumes rail transportation to disposal facility.
TOTAL UNIT COST:															\$266,724,501		

## Notes:

HTRW productivity factor is from Exhibit B-3 or B-4 of "A Guide to Developing and Documenting Cost Estimates During the Feasibility Study", EPA 2000

The Cost Database Code is a reference code for linking with line item cost information with the cost source database and is not otherwise used within these cost worksheets.

## Source of Cost Data:

NA Not Applicable - costs are from previous work or vendor quote

For citation references, the following sources apply:

MII (MII Assemblies), GSA (www.gsa.gov), FLC (www.flcdatcenter.com), A (Allowance), V (Vendor Quote), CW (Means CostWorks 2015), P (Previous Work), and FRTR (www.frtr.gov)

## Cost Adjustment Checklist:

FACTOR:  
 H&S Productivity (labor and equipment only)  
 Escalation to Base Year  
 Area Cost Factor  
 Subcontractor Overhead and Profit  
 Prime Contractor Overhead and Profit

## NOTES:

Field work will be in Level "D" PPE.

MII assembly costs include HPF adjustments.

2015 cost sources are not escalated (EF=1.00). All other costs are escalated based on the USACE CWCCIS, EM 1110-2-1304, Mar 2015.

An AF of 1.05 is used for Oregon, except that an AF of 1.00 (national unmodified average) is used for MII assembly costs and local vendor quotes.

It is assumed that home office OH is 8% and profit is 9% for the Prime Contractor. Professional labor overhead is 100%. Allowances and items with mandated costs such as per diem do not have overhead and profit applied.

Items previously developed by Anchor QEA (2010) already include contractor markups, therefore overhead and profit were not applied to those items.

It is assumed that OH is 1% and profit is 0% for vendor quotes for treatment and disposal at offsite disposal facilities. It is assumed that OH is 5% and profit is 0% for quotes for all other material vendor quotes.

## Abbreviations:

QTY	Quantity	ACR	Acres
EQUIP	Equipment	BCY	Bank Cubic Yard
MATL	Material	CLF	100 Linear Foot
HPF	HTRW Productivity Factor	DY	Days
ADJ LABOR	Adjusted Labor for HPF	EA	Each
ADJ EQUIP	Adjusted Equipment for HPF	LF	Linear Foot
UNMOD UC	Unmodified Unit Cost	HR	Hours
UNMOD LIC	Unmodified Line Item Cost	LB	Pounds
UNBUR LIC	Unburdened Line Item Cost	LCY	Loose Cubic Yard
PC OH	Prime Contractor Overhead	LS	Lump Sum
PC PF	Prime Contractor Profit	RL	Roll
BUR LIC	Burdened Line Item Cost	SY	Square Yard
		TN	Tons

TABLE CW-E14

<div style="display: flex; justify-content: space-between;"> <div> <b>Alternative E</b>  <b>Capital Cost Sub-Element</b>  <b>Mitigation</b> </div> <div> <b>Cost Worksheet: CW-E14</b> </div> <div style="text-align: right;"> <b>COST WORKSHEET</b> </div> </div>																		
<b>Site:</b> Portland Harbor Superfund Site <b>Location:</b> Portland, Oregon <b>Phase:</b> Draft Feasibility Study <b>Base Year:</b> 2015												<b>Prepared By:</b> AB  <b>Checked By:</b> JN		<b>Date:</b> 8/11/2015  <b>Date:</b> 8/12/2015				
<b>Work Statement:</b> This sub-element involves mitigation of shallow water and riverbank areas. It includes costs for on-site labor, equipment, and materials developed from previous work.																		
<b>Cost Analysis:</b> Cost for Mitigation (Lump Sum)																		
COST DATABASE CODE	DESCRIPTION	QTY	UNIT(S)	HPF	LABOR	ADJ LABOR	EQUIP	ADJ EQUIP	MATL	OTHER	UNMOD UC	UNMOD LIC	PC OH	PC PF	BUR LIC	COST SOURCE CITATION	COMMENTS	
P50	Mitigation	42.4	AC	1.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$2,347,130.25	\$2,347,130.25	\$99,518,322.60	0%	0%	\$99,518,323	P Previous Work	Average cost of two Lower Duwamish projects presented and referenced in Table 6.1-1 by Anchor QEA (2010).	
												<b>TOTAL UNIT COST:</b>						
<div style="display: flex; justify-content: space-between;"> <div style="width: 60%;"> <b>Notes:</b>            HTRW productivity factor is from Exhibit B-3 or B-4 of "A Guide to Developing and Documenting Cost Estimates During the Feasibility Study", EPA 2000            The Cost Database Code is a reference code for linking with line item cost information with the cost source database and is not otherwise used within these cost worksheets.   <b>Source of Cost Data:</b>            NA Not Applicable - costs are from previous work or vendor quote            For citation references, the following sources apply:            MII (MII Assemblies), GSA (www.gsa.gov), FLC (www.flcdatcenter.com), A (Allowance), V (Vendor Quote), CW (Means CostWorks 2015), P (Previous Work), and FRTR (www.frtr.gov)         </div> <div style="width: 35%;"> <b>Abbreviations:</b>            QTY Quantity            EQUIP Equipment            MATL Material            HPF HTRW Productivity Factor            ADJ LABOR Adjusted Labor for HFP            ADJ EQUIP Adjusted Equipment for HFP            UNMOD UC Unmodified Unit Cost            UNMOD LIC Unmodified Line Item Cost            UNBUR LIC Unburdened Line Item Cost            PC OH Prime Contractor Overhead            PC PF Prime Contractor Profit            BUR LIC Burdened Line Item Cost             ACR Acres            BCY Bank Cubic Yard            CLF 100 Linear Foot            DY Days            EA Each            LF Linear Foot            HR Hours            LB Pounds            LCY Loose Cubic Yard            LS Lump Sum            RL Roll            SY Square Yard            TN Tons         </div> </div>																		
<div style="display: flex; justify-content: space-between;"> <div style="width: 40%;"> <b>Cost Adjustment Checklist:</b>            FACTOR:            H&amp;S Productivity (labor and equipment only)            Escalation to Base Year            Area Cost Factor            Subcontractor Overhead and Profit            Prime Contractor Overhead and Profit         </div> <div style="width: 60%;"> <b>NOTES:</b>            Field work will be in Level "D" PPE.            MII assembly costs include HPF adjustments.            2015 cost sources are not escalated (EF=1.00). All other costs are escalated based on the USACE CWCCIS, EM 1110-2-1304, Mar 2015.            An AF of 1.05 is used for Oregon, except that an AF of 1.00 (national unmodified average) is used for MII assembly costs and local vendor quotes.            It is assumed that home office OH is 8% and profit is 9% for the Prime Contractor. Professional labor overhead is 100%. Allowances and items with mandated costs such as per diem do not have overhead and profit applied.            Items previously developed by Anchor QEA (2010) already include contractor markups, therefore overhead and profit were not applied to those items.            It is assumed that OH is 1% and profit is 0% for vendor quotes for treatment and disposal at offsite disposal facilities. It is assumed that OH is 5% and profit is 0% for quotes for all other material vendor quotes.         </div> </div>																		

TABLE CW-E15

Alternative E		Cost Worksheet: CW-E15		COST WORKSHEET	
Capital Cost Sub-Element					
Sand Placement for Technology Assignments					
Site:	Portland Harbor Superfund Site	Prepared By: JN	Date: 7/27/2015		
Location:	Portland, Oregon				
Phase:	Draft Feasibility Study	Checked By: AS	Date: 7/28/2015		
Base Year:	2015				

**Work Statement:**

This sub-element involves the placement of sand for the construction of capping areas. It includes placement of sand within confined areas as well as open water areas. It includes costs for on-site labor, equipment, and materials developed from previous work.

**Cost Analysis:**

Cost for Sand Placement for Technology Assignments (Lump Sum)

COST DATABASE CODE	DESCRIPTION	QTY	UNIT(S)	HPF	LABOR	ADJ LABOR	EQUIP	ADJ EQUIP	MATL	OTHER	UNMOD UC	UNMOD LIC	PC OH	PC PF	BUR LIC	COST SOURCE CITATION	COMMENTS
	<b>Sand Placement (Riverbanks)</b>																
P2	Sand Placement (Confined)	50,409	LCY	1.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$49.01	\$49.01	\$2,470,293.05	0%	0%	\$2,470,293	P Previous Work	Developed by Anchor QEA (2010)
M1	Sand	50,409	LCY	1.00	\$0.00	\$0.00	\$0.00	\$0.00	\$19.71	\$0.00	\$19.71	\$993,561.39	0%	0%	\$993,561	P Previous Work	Knife River Quote #7838 (2010)
	<b>Sand Placement (Confined)</b>																
P2	Sand Placement (Confined)	90,426	LCY	1.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$49.01	\$49.01	\$4,431,326.13	0%	0%	\$4,431,326	P Previous Work	Developed by Anchor QEA (2010)
M1	Sand	90,426	LCY	1.00	\$0.00	\$0.00	\$0.00	\$0.00	\$19.71	\$0.00	\$19.71	\$1,782,296.46	0%	0%	\$1,782,296	P Previous Work	Knife River Quote #7838 (2010)
	<b>Sand Placement (Open Water)</b>																
P6	Sand Placement (Open Water)	621,574	LCY	1.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$23.76	\$23.76	\$14,768,598.24	0%	0%	\$14,768,598	P Previous Work	Developed by Anchor QEA (2010)
M1	Sand	621,574	LCY	1.00	\$0.00	\$0.00	\$0.00	\$0.00	\$19.71	\$0.00	\$19.71	\$12,251,223.54	0%	0%	\$12,251,224	P Previous Work	Knife River Quote #7838 (2010)
<b>TOTAL UNIT COST:</b>															<b>\$36,697,298</b>		

**Notes:**

HTRW productivity factor is from Exhibit B-3 or B-4 of "A Guide to Developing and Documenting Cost Estimates During the Feasibility Study", EPA 2000  
The Cost Database Code is a reference code for linking with line item cost information with the cost source database and is not otherwise used within these cost worksheets.

**Source of Cost Data:**

NA Not Applicable - costs are from previous work or vendor quote

For citation references, the following sources apply:

MII (MII Assemblies), GSA (www.gsa.gov), FLC (www.flcdatcenter.com), A (Allowance), V (Vendor Quote), CW (Means CostWorks 2015), P (Previous Work), and FRTR (www.frtr.gov)

**Cost Adjustment Checklist:**

FACTOR:  
H&S Productivity (labor and equipment only)  
Escalation to Base Year  
Area Cost Factor  
Subcontractor Overhead and Profit  
Prime Contractor Overhead and Profit

**NOTES:**

Field work will be in Level "D" PPE.  
MII assembly costs include HPF adjustments.  
2015 cost sources are not escalated (EF=1.00). All other costs are escalated based on the USACE CWCCIS, EM 1110-2-1304, Mar 2015.  
An AF of 1.05 is used for Oregon, except that an AF of 1.00 (national unmodified average) is used for MII assembly costs and local vendor quotes.  
It is assumed that home office OH is 8% and profit is 9% for the Prime Contractor. Professional labor overhead is 100%. Allowances and items with mandated costs such as per diem do not have overhead and profit applied.  
Items previously developed by Anchor QEA (2010) already include contractor markups, therefore overhead and profit were not applied to those items.  
It is assumed that OH is 1% and profit is 0% for vendor quotes for treatment and disposal at offsite disposal facilities. It is assumed that OH is 5% and profit is 0% for quotes for all other material vendor quotes.

**Abbreviations:**

QTY	Quantity	ACR	Acres
EQUIP	Equipment	BCY	Bank Cubic Yard
MATL	Material	CLF	100 Linear Foot
HPF	HTRW Productivity Factor	DY	Days
ADJ LABOR	Adjusted Labor for HFP	EA	Each
ADJ EQUIP	Adjusted Equipment for HFP	LF	Linear Foot
UNMOD UC	Unmodified Unit Cost	HR	Hours
UNMOD LIC	Unmodified Line Item Cost	LB	Pounds
UNBUR LIC	Unburdened Line Item Cost	LCY	Loose Cubic Yard
PC OH	Prime Contractor Overhead	LS	Lump Sum
PC PF	Prime Contractor Profit	RL	Roll
BUR LIC	Burdened Line Item Cost	SY	Square Yard
		TN	Tons

TABLE CW-E16

Alternative E		Cost Worksheet: CW-E16		COST WORKSHEET	
Capital Cost Sub-Element					
Beach Mix Placement for Technology Assignments					
Site:	Portland Harbor Superfund Site	Prepared By:	JN	Date:	7/27/2015
Location:	Portland, Oregon				
Phase:	Draft Feasibility Study	Checked By:	AS	Date:	7/28/2015
Base Year:	2015				

**Work Statement:**  
This sub-element involves the placement of beach mix for the construction of capping areas. It includes placement of beach mix within confined areas as well as open water areas. It includes costs for on-site labor, equipment, and materials developed from previous work.

**Cost Analysis:**  
Cost for Beach Mix Placement for Technology Assignments (Lump Sum)

COST DATABASE CODE	DESCRIPTION	QTY	UNIT(S)	HPF	LABOR	ADJ LABOR	EQUIP	ADJ EQUIP	MATL	OTHER	UNMOD UC	UNMOD LIC	PC OH	PC PF	BUR LIC	COST SOURCE CITATION	COMMENTS
	Beach Mix Placement (Riverbanks)																
P5	Beach Mix Placement (Confined)	8,954	LCY	1.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$58.50	\$58.50	\$523,809.00	0%	0%	\$523,809	P Previous Work	Developed by Anchor QEA (2010)
M5	ODOT 100 Beach Mix	8,954	LCY	1.00	\$0.00	\$0.00	\$0.00	\$0.00	\$57.59	\$0.00	\$57.59	\$515,660.86	0%	0%	\$515,661	P Previous Work	Knife River Quote #7838 (2010)
	Beach Mix Placement (Confined)																
P5	Beach Mix Placement (Confined)	3,087	LCY	1.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$58.50	\$58.50	\$180,589.50	0%	0%	\$180,590	P Previous Work	Developed by Anchor QEA (2010)
M5	ODOT 100 Beach Mix	3,087	LCY	1.00	\$0.00	\$0.00	\$0.00	\$0.00	\$57.59	\$0.00	\$57.59	\$177,780.33	0%	0%	\$177,780	P Previous Work	Knife River Quote #7838 (2010)
	Beach Mix Placement (Open Water)																
P39	Beach Mix Placement (Open Water)	23,307	LCY	1.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$28.34	\$28.34	\$660,491.25	0%	0%	\$660,491	P Previous Work	Developed by Anchor QEA (2010)
M5	ODOT 100 Beach Mix	23,307	LCY	1.00	\$0.00	\$0.00	\$0.00	\$0.00	\$57.59	\$0.00	\$57.59	\$1,342,250.13	0%	0%	\$1,342,250	P Previous Work	Knife River Quote #7838 (2010)
<b>TOTAL UNIT COST:</b>															\$3,400,581		

**Notes:**  
HTRW productivity factor is from Exhibit B-3 or B-4 of "A Guide to Developing and Documenting Cost Estimates During the Feasibility Study", EPA 2000  
The Cost Database Code is a reference code for linking with line item cost information with the cost source database and is not otherwise used within these cost worksheets.

**Source of Cost Data:**  
NA Not Applicable - costs are from previous work or vendor quote  
For citation references, the following sources apply:  
MII (MII Assemblies), GSA (www.gsa.gov), FLC (www.flcdatcenter.com), A (Allowance), V (Vendor Quote), CW (Means CostWorks 2015), P (Previous Work), and FRTR (www.frtr.gov)

**Cost Adjustment Checklist:**  
FACTOR:  
H&S Productivity (labor and equipment only)  
Escalation to Base Year  
Area Cost Factor  
Subcontractor Overhead and Profit  
Prime Contractor Overhead and Profit

**NOTES:**  
Field work will be in Level "D" PPE.  
MII assembly costs include HPF adjustments.  
2015 cost sources are not escalated (EF=1.00). All other costs are escalated based on the USACE CWCCIS, EM 1110-2-1304, Mar 2015.  
An AF of 1.05 is used for Oregon, except that an AF of 1.00 (national unmodified average) is used for MII assembly costs and local vendor quotes.  
It is assumed that home office OH is 8% and profit is 9% for the Prime Contractor. Professional labor overhead is 100%. Allowances and items with mandated costs such as per diem do not have overhead and profit applied.  
Items previously developed by Anchor QEA (2010) already include contractor markups, therefore overhead and profit were not applied to those items.  
It is assumed that OH is 1% and profit is 0% for vendor quotes for treatment and disposal at offsite disposal facilities. It is assumed that OH is 5% and profit is 0% for quotes for all other material vendor quotes.

**Abbreviations:**  
QTY Quantity  
EQUIP Equipment  
MATL Material  
HPF HTRW Productivity Factor  
ADJ LABOR Adjusted Labor for HFP  
ADJ EQUIP Adjusted Equipment for HFP  
UNMOD UC Unmodified Unit Cost  
UNMOD LIC Unmodified Line Item Cost  
UNBUR LIC Unburdened Line Item Cost  
PC OH Prime Contractor Overhead  
PC PF Prime Contractor Profit  
BUR LIC Burdened Line Item Cost  
ACR Acres  
BCY Bank Cubic Yard  
CLF 100 Linear Foot  
DY Days  
EA Each  
LF Linear Foot  
HR Hours  
LB Pounds  
LCY Loose Cubic Yard  
LS Lump Sum  
RL Roll  
SY Square Yard  
TN Tons

TABLE CW-E17

Alternative E		Cost Worksheet: CW-E17		COST WORKSHEET	
Capital Cost Sub-Element					
Armor Placement for Technology Assignments					
Site:	Portland Harbor Superfund Site	Prepared By: JN	Date: 7/27/2015		
Location:	Portland, Oregon				
Phase:	Draft Feasibility Study	Checked By: AS	Date: 7/28/2015		
Base Year:	2015				

**Work Statement:**

This sub-element involves the placement of armor for the construction of capping areas. It includes placement of armor with confined areas as well as open water areas. It includes costs for on-site labor, equipment, and materials developed from previous work.

**Cost Analysis:**

Cost for Armor Placement for Technology Assignments (Lump Sum)

COST DATABASE CODE	DESCRIPTION	QTY	UNIT(S)	HPF	LABOR	ADJ LABOR	EQUIP	ADJ EQUIP	MATL	OTHER	UNMOD UC	UNMOD LIC	PC OH	PC PF	BUR LIC	COST SOURCE CITATION	COMMENTS
	<b>Armor Placement (Riverbanks)</b>																
P3	ODOT 200 Placement (Confined)	7,583	LCY	1.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$58.50	\$58.50	\$443,605.50	0%	0%	\$443,606	P Previous Work	Developed by Anchor QEA (2010)
M2	ODOT 200 Armor	7,583	LCY	1.00	\$0.00	\$0.00	\$0.00	\$0.00	\$57.59	\$0.00	\$57.59	\$436,704.97	0%	0%	\$436,705	P Previous Work	Knife River Quote #7838 (2010)
	<b>Armor Placement (Confined)</b>																
P3	ODOT 200 Placement (Confined)	20,744	LCY	1.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$58.50	\$58.50	\$1,213,524.00	0%	0%	\$1,213,524	P Previous Work	Developed by Anchor QEA (2010)
M2	ODOT 200 Armor	20,744	LCY	1.00	\$0.00	\$0.00	\$0.00	\$0.00	\$57.59	\$0.00	\$57.59	\$1,194,646.96	0%	0%	\$1,194,647	P Previous Work	Knife River Quote #7838 (2010)
	<b>Armor Placement (Open Water)</b>																
P7	ODOT 200 Placement (Open Water)	40,059	LCY	1.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$28.34	\$28.34	\$1,135,221.99	0%	0%	\$1,135,222	P Previous Work	Developed by Anchor QEA (2010)
M2	ODOT 200 Armor	40,059	LCY	1.00	\$0.00	\$0.00	\$0.00	\$0.00	\$57.59	\$0.00	\$57.59	\$2,306,997.81	0%	0%	\$2,306,998	P Previous Work	Knife River Quote #7838 (2010)
<b>TOTAL UNIT COST:</b>															<b>\$6,730,702</b>		

**Notes:**

HTRW productivity factor is from Exhibit B-3 or B-4 of "A Guide to Developing and Documenting Cost Estimates During the Feasibility Study", EPA 2000  
The Cost Database Code is a reference code for linking with line item cost information with the cost source database and is not otherwise used within these cost worksheets.

**Source of Cost Data:**

NA Not Applicable - costs are from previous work or vendor quote

For citation references, the following sources apply:

MII (MII Assemblies), GSA (www.gsa.gov), FLC (www.flcdatcenter.com), A (Allowance), V (Vendor Quote), CW (Means CostWorks 2015), P (Previous Work), and FRTR (www.frtr.gov)

**Cost Adjustment Checklist:**

FACTOR:  
H&S Productivity (labor and equipment only)  
Escalation to Base Year  
Area Cost Factor  
Subcontractor Overhead and Profit  
Prime Contractor Overhead and Profit

**NOTES:**

Field work will be in Level "D" PPE.  
MII assembly costs include HPF adjustments.  
2015 cost sources are not escalated (EF=1.00). All other costs are escalated based on the USACE CWCCIS, EM 1110-2-1304, Mar 2015.  
An AF of 1.05 is used for Oregon, except that an AF of 1.00 (national unmodified average) is used for MII assembly costs and local vendor quotes.  
It is assumed that home office OH is 8% and profit is 9% for the Prime Contractor. Professional labor overhead is 100%. Allowances and items with mandated costs such as per diem do not have overhead and profit applied.  
Items previously developed by Anchor QEA (2010) already include contractor markups, therefore overhead and profit were not applied to those items.  
It is assumed that OH is 1% and profit is 0% for vendor quotes for treatment and disposal at offsite disposal facilities. It is assumed that OH is 5% and profit is 0% for quotes for all other material vendor quotes.

**Abbreviations:**

QTY	Quantity	ACR	Acres
EQUIP	Equipment	BCY	Bank Cubic Yard
MATL	Material	CLF	100 Linear Foot
HPF	HTRW Productivity Factor	DY	Days
ADJ LABOR	Adjusted Labor for HFP	EA	Each
ADJ EQUIP	Adjusted Equipment for HFP	LF	Linear Foot
UNMOD UC	Unmodified Unit Cost	HR	Hours
UNMOD LIC	Unmodified Line Item Cost	LB	Pounds
UNBUR LIC	Unburdened Line Item Cost	LCY	Loose Cubic Yard
PC OH	Prime Contractor Overhead	LS	Lump Sum
PC PF	Prime Contractor Profit	RL	Roll
BUR LIC	Burdened Line Item Cost	SY	Square Yard
		TN	Tons

TABLE CW-E18

<div style="display: flex; justify-content: space-between;"> <span>Alternative E</span> <span>Cost Worksheet: CW-E18</span> </div> <div style="display: flex; justify-content: space-between; margin-top: 5px;"> <span>Capital Cost Sub-Element</span> <span><b>COST WORKSHEET</b></span> </div> <div style="display: flex; justify-content: space-between; margin-top: 5px;"> <span>Reactive/GAC Placement for Technology Assignments</span> </div>																	
<b>Site:</b> Portland Harbor Superfund Site <b>Location:</b> Portland, Oregon <b>Phase:</b> Draft Feasibility Study <b>Base Year:</b> 2015												<b>Prepared By:</b> JN  <b>Checked By:</b> AS			<b>Date:</b> 7/27/2015  <b>Date:</b> 7/28/2015		
<b>Work Statement:</b> This sub-element involves the placement of the reactive layers for the construction of capping areas. It includes placement of armor within confined areas as well as open water areas. It includes costs for on-site labor, equipment, and materials developed from previous work, as well as recent vendor quotes.																	
<b>Cost Analysis:</b> Cost for Reactive/GAC Placement for Technology Assignments (Lump Sum)																	
COST DATABASE CODE	DESCRIPTION	QTY	UNIT(S)	HPF	LABOR	ADJ LABOR	EQUIP	ADJ EQUIP	MATL	OTHER	UNMOD UC	UNMOD LIC	PC OH	PC PF	BUR LIC	COST SOURCE CITATION	COMMENTS
	<b>Reactive/GAC Placement (Riverbanks)</b>																
P40	Carbon (AquaGate + PAC 5%) Placement (Confined)	916	TON	1.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$816.75	\$816.75	\$748,143.00	0%	0%	\$748,143	P Previous Work	Adapted from unit cost developed by Anchor QEA (2010). Unit cost is \$/TON as carbon
M4	Carbon (AquaGate + PAC 5%)	916	TON	1.00	\$0.00	\$0.00	\$0.00	\$0.00	\$8,000.00	\$0.00	\$8,000.00	\$7,328,000.00	5%	0%	\$7,694,400	V Vendor Quote	Vendor Quote - AquaBlok 2015. Material cost is \$/TON (as Carbon).
	<b>Reactive/GAC Placement (Confined)</b>																
P40	Carbon (AquaGate + PAC 5%) Placement (Confined)	1,452	TON	1.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$816.75	\$816.75	\$1,185,921.00	0%	0%	\$1,185,921	P Previous Work	Adapted from unit cost developed by Anchor QEA (2010). Unit cost is \$/TON as carbon
M4	Carbon (AquaGate + PAC 5%)	1,452	TON	1.00	\$0.00	\$0.00	\$0.00	\$0.00	\$8,000.00	\$0.00	\$8,000.00	\$11,616,000.00	5%	0%	\$12,196,800	V Vendor Quote	Vendor Quote - AquaBlok 2015. Material cost is \$/TON (as Carbon).
	<b>Reactive/GAC Placement (Open Water)</b>																
P41	Carbon (AquaGate + PAC 5%) Placement (Open Water)	13,042	TON	1.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$396.00	\$396.00	\$5,164,632.00	0%	0%	\$5,164,632	P Previous Work	Adapted from unit cost developed by Anchor QEA (2010). Unit cost is \$/TON as carbon.
M4	Carbon (AquaGate + PAC 5%)	13,042	TON	1.00	\$0.00	\$0.00	\$0.00	\$0.00	\$8,000.00	\$0.00	\$8,000.00	\$104,336,000.00	5%	0%	\$109,552,800	V Vendor Quote	Vendor Quote - AquaBlok 2015. Material cost is \$/TON (as Carbon).
												<b>TOTAL UNIT COST:</b>		<b>\$136,542,696</b>			
<div style="display: flex; justify-content: space-between;"> <div style="width: 60%;"> <b>Notes:</b>            HTRW productivity factor is from Exhibit B-3 or B-4 of "A Guide to Developing and Documenting Cost Estimates During the Feasibility Study", EPA 2000            The Cost Database Code is a reference code for linking with line item cost information with the cost source database and is not otherwise used within these cost worksheets.   <b>Source of Cost Data:</b>            NA Not Applicable - costs are from previous work or vendor quote            For citation references, the following sources apply:            MII (MII Assemblies), GSA (www.gsa.gov), FLC (www.flcdatcenter.com), A (Allowance), V (Vendor Quote), CW (Means CostWorks 2015), P (Previous Work), and FRTR (www.frtr.gov)         </div> <div style="width: 35%;"> <b>Abbreviations:</b>            QTY Quantity            EQUIP Equipment            MATL Material            HPF HTRW Productivity Factor            ADJ LABOR Adjusted Labor for HFP            ADJ EQUIP Adjusted Equipment for HFP            UNMOD UC Unmodified Unit Cost            UNMOD LIC Unmodified Line Item Cost            UNBUR LIC Unburdened Line Item Cost            PC OH Prime Contractor Overhead            PC PF Prime Contractor Profit            BUR LIC Burdened Line Item Cost         </div> <div style="width: 35%;">           ACR Acres            BCY Bank Cubic Yard            CLF 100 Linear Foot            DY Days            EA Each            LF Linear Foot            HR Hours            LB Pounds            LCY Loose Cubic Yard            LS Lump Sum            RL Roll            SY Square Yard            TN Tons         </div> </div>																	
<div style="display: flex; justify-content: space-between;"> <div style="width: 45%;"> <b>Cost Adjustment Checklist:</b>            FACTOR:            H&amp;S Productivity (labor and equipment only)            Escalation to Base Year            Area Cost Factor            Subcontractor Overhead and Profit            Prime Contractor Overhead and Profit         </div> <div style="width: 50%;"> <b>NOTES:</b>            Field work will be in Level "D" PPE.            MII assembly costs include HPF adjustments.            2015 cost sources are not escalated (EF=1.00). All other costs are escalated based on the USACE WCCIS, EM 1110-2-1304, Mar 2015.            An AF of 1.05 is used for Oregon, except that an AF of 1.00 (national unmodified average) is used for MII assembly costs and local vendor quotes.            It is assumed that home office OH is 8% and profit is 9% for the Prime Contractor. Professional labor overhead is 100%. Allowances and items with mandated costs such as per diem do not have overhead and profit applied.            Items previously developed by Anchor QEA (2010) already include contractor markups, therefore overhead and profit were not applied to those items.            It is assumed that OH is 1% and profit is 0% for vendor quotes for treatment and disposal at offsite disposal facilities. It is assumed that OH is 5% and profit is 0% for quotes for all other material vendor quotes.         </div> </div>																	

## TABLE CW-E19

## COST WORKSHEET

**Prepared By:** JN      **Date:** 7/27/2015

**Checked By:** AS      **Date:** 7/28/2015

**Cost Analysis:**  
Cost for Geofabric for Riverbanks (Lump Sum)

<b>Notes:</b>		<b>Abbreviations:</b>	
<p>HTRW productivity factor is from Exhibit B-3 or B-4 of "A Guide to Developing and Documenting Cost Estimates During the Feasibility Study", EPA 2000</p> <p>The Cost Database Code is a reference code for linking with line item cost information with the cost source database and is not otherwise used within these cost worksheets.</p>		<p>QTY Quantity</p> <p>EQUIP Equipment</p> <p>MATL Material</p> <p>HPF HTRW Productivity Factor</p> <p>ADJ LABOR Adjusted Labor for HPF</p> <p>ADJ EQUIP Adjusted Equipment for HPF</p> <p>UNMOD UC Unmodified Unit Cost</p> <p>UNMOD LIC Unmodified Line Item Cost</p> <p>UNBUR LIC Unburdened Line Item Cost</p> <p>PC OH Prime Contractor Overhead</p> <p>PC PF Prime Contractor Profit</p> <p>BUR LIC Burdened Line Item Cost</p>	<p>ACR Acres</p> <p>BCY Bank Cubic Yard</p> <p>CLF 100 Linear Foot</p> <p>DY Days</p> <p>EA Each</p> <p>LF Linear Foot</p> <p>HR Hours</p> <p>LB Pounds</p> <p>LCY Loose Cubic Yard</p> <p>LS Lump Sum</p> <p>RL Roll</p> <p>SY Square Yard</p> <p>TN Tons</p>
<b>Source of Cost Data:</b>			
<p>NA Not Applicable - costs are from previous work or vendor quote</p> <p>For citation references, the following sources apply:</p> <p>MII (MII Assemblies), GSA (www.gsa.gov), FLC (www.flcdatacenter.com), A (Allowance), V (Vendor Quote), CW (Means CostWorks 2015), P (Previous Work), and FRTR (www.ftrr.gov)</p>			
<b>Cost Adjustment Checklist:</b>		<b>NOTES:</b>	
FACTOR:	Field work will be in Level "D" PPE.		
H&S Productivity (labor and equipment only)	MII assembly costs include HPF adjustments.		
Escalation to Base Year	2015 cost sources are not escalated (EF=1.00). All other costs are escalated based on the USACE CCWCIS, EM 1110-2-1304, Mar 2015.		
Area Cost Factor	An AF of 1.05 is used for Oregon, except that an AF of 1.00 (national unmodified average) is used for MII assembly costs and local vendor quotes.		
Subcontractor Overhead and Profit	It is assumed that home office OH is 8% and profit is 9% for the Prime Contractor. Professional labor overhead is 100%. Allowances and items with mandated costs such as per diem do not have overhead and profit applied.		
Prime Contractor Overhead and Profit	Items previously developed by Anchor QEA (2010) already include contractor markups, therefore overhead and profit were not applied to those items.		
	It is assumed that OH is 1% and profit is 0% for vendor quotes for treatment and disposal at offsite disposal facilities. It is assumed that OH is 5% and profit is 0% for quotes for all other material vendor quotes.		



## TABLE CW-E20

## Capital Cost Sub-Element COST WORKSHEET

## Organoclay Mat Placement for Technology Assignments

<b>Site:</b>	Portland Harbor Superfund Site	<b>Prepared By:</b> JN	<b>Date:</b> 7/27/2015
<b>Location:</b>	Portland, Oregon		
<b>Phase:</b>	Draft Feasibility Study	<b>Checked By:</b> AS	<b>Date:</b> 7/28/2015
<b>Base Year:</b>	2015		

This sub-element involves the placement of the organoclay mat for the construction of capping areas. It includes placement of the organoclay mat within confined areas as well as open water areas. It includes costs for on-site labor, equipment, and materials developed from previous work.

**Cost Analysis:**  
Cost for Organoclay Mat Placement for Technology Assignments (Lump Sum)

COST DATABASE CODE	DESCRIPTION	QTY	UNIT(S)	HPF	LABOR	ADJ LABOR	EQUIP	ADJ EQUIP	MATL	OTHER	UNMOD UC	UNMOD LIC	PC OH	PC PF	BUR LIC	COST SOURCE CITATION	COMMENTS
	<b>Organoclay Mat Placement (Riverbanks)</b>																
P23	Organoclay Mat Material and Placement (Confined)	43,560	SF	1.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$23.74	\$23.74	\$1,034,005.50	0%	0%	\$1,034,006	P Previous Work	Developed by Anchor QEA (2010)
	<b>Organoclay Mat Placement (Confined)</b>																
P23	(Confined)	139,392	SF	1.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$23.74	\$23.74	\$3,308,817.60	0%	0%	\$3,308,818	P Previous Work	Developed by Anchor QEA (2010)
	<b>Organoclay Mat Placement (Open Water)</b>																
P24	Organoclay Mat Material and Placement (Open)	635,976	SF	1.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$7.09	\$7.09	\$4,507,479.90	0%	0%	\$4,507,480	P Previous Work	Developed by Anchor QEA (2010)
												<b>TOTAL UNIT COST:</b>		\$8,850,304			

HTRW productivity factor is from Exhibit B-3 or B-4 of "A Guide to Developing and Documenting Cost Estimates During the Feasibility Study", EPA 2000	QTY	Quantity	ACR	Acre
--	-----	----------	-----	------

<p>HTRW productivity factor is from Exhibit B-3 or B-4 of "A Guide to Developing and Documenting Cost Estimates During the Feasibility Study", EPA 2000</p> <p>The Cost Database Code is a reference code for linking with line item cost information with the cost source database and is not otherwise used within these cost worksheets.</p>			QTY	Quantity	ACR	Acres
			EQUIP	Equipment	BCY	Bank Cubic Yard

QTY	Quantity	ACR	Acres
-----	----------	-----	-------

QTY	Quantity	ACR	Acres
EQUIP	Equipment	BCY	Bank Cubic Yard
MATL	Material	CLF	100 Linear Foot
HPF	HTRW Productivity Factor	DY	Days
J LABOR	Adjusted Labor for HFP	EA	Each
J EQUIP	Adjusted Equipment for HFP	LF	Linear Foot
MOD UC	Unmodified Unit Cost	HR	Hours
MOD LIC	Unmodified Line Item Cost	LB	Pounds
UBUR LIC	Unburdened Line Item Cost	LCY	Loose Cubic Yard
PC OH	Prime Contractor Overhead	LS	Lump Sum
PC PF	Prime Contractor Profit	RL	Roll
BUR LIC	Burdened Line Item Cost	SY	Square Yard

NA	Not Applicable - costs are from previous work or vendor quote	ADJ LABOR	Adjusted Labor for HFP	EA	Each
----	---	-----------	------------------------	----	------

For citation references, the following sources apply:

MII (MII Assemblies), GSA ( <a href="http://www.gsa.gov">www.gsa.gov</a> ), FLC ( <a href="http://www.flcdatadcenter.com">www.flcdatadcenter.com</a> ), A (Allowance), V (Vendor Quote), CW (Means CostWorks 2015), P (Previous Work), and FRTR ( <a href="http://www.frtr.gov">www.frtr.gov</a> )	ADJ EQUIP Adjusted Equipment for HFP	LF Linear Foot
	UNMOD UC Unmodified Unit Cost	HR Hours

FACTOR:	Field work will be in Level "D" PPE.	PC OH	Prime Contractor Overhead	LS	Lump Sum
---------	--------------------------------------	-------	---------------------------	----	----------

FACTOR:	Field work will be in Level "D" PPE.	PC OH	Prime Contractor Overhead	LS	Lump Sum
H&S Productivity (labor and equipment only)	MII assembly costs include HPF adjustments.	PC PF	Prime Contractor Profit	RL	Roll
Escalation to Base Year	2015 cost sources are not escalated (EF=1.00). All other costs are escalated based on the USACE WCWCCS, EM 1110-2-1304, Mar 2015.	BUR LIC	Burdened Line Item Cost	SY	Square Yard
Area Cost Factor	An AF of 1.05 is used for Oregon, except that an AF of 1.00 (national unmodified average) is used for MII assembly costs and local vendor quotes.			TN	Tons
Subcontractor Overhead and Profit	It is assumed that home office OH is 8% and profit is 9% for the Prime Contractor. Professional labor overhead is 100%. Allowances and items with mandated costs such as per diem do not have overhead and profit applied.				
Prime Contractor Overhead and Profit	Items previously developed by Anchor QEA (2010) already include contractor markups, therefore overhead and profit were not applied to those items. It is assumed that OH is 1% and profit is 0% for vendor quotes for treatment and disposal at offsite disposal facilities. It is assumed that OH is 5% and profit is 0% for quotes for all other material vendor quotes.				

TABLE CW-E21

<div style="display: flex; justify-content: space-between;"> <div> <b>Alternative E</b>  <b>Capital Cost Sub-Element</b>  <b>Transload Facility Development</b> </div> <div> <b>Cost Worksheet: CW-E21</b> </div> <div style="text-align: right;"> <b>COST WORKSHEET</b> </div> </div>																	
<b>Site:</b> Portland Harbor Superfund Site <b>Location:</b> Portland, Oregon <b>Phase:</b> Draft Feasibility Study <b>Base Year:</b> 2015												<b>Prepared By:</b> JN <b>Date:</b> 7/27/2015					
												<b>Checked By:</b> AS <b>Date:</b> 7/28/2015					
<b>Work Statement:</b> This sub-element involves the development of a transload facility for facilitating offsite disposal of contaminated sediments. It includes costs for on-site labor, equipment, and materials developed from previous work. Transload facility is expected to be operated for 7 years, based on estimated construction duration.																	
<b>Cost Analysis:</b> Cost for Transload Facility Development (Lump Sum)																	
COST DATABASE CODE	DESCRIPTION	QTY	UNIT(S)	HPF	LABOR	ADJ LABOR	EQUIP	ADJ EQUIP	MATL	OTHER	UNMOD UC	UNMOD LIC	PC OH	PC PF	BUR LIC	COST SOURCE CITATION	COMMENTS
	Transload Facility Development																
P31	Transload Facility Permitting	1	LS	1.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$45,000.00	\$45,000.00	\$45,000.00	0%	0%	\$45,000	P Previous Work	Developed by Anchor QEA (2010)
P32	Transload Facility Development	1	LS	1.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$8,437,500.00	\$8,437,500.00	\$8,437,500.00	0%	0%	\$8,437,500	P Previous Work	Developed by Anchor QEA (2010)
P33	Yearly Property Lease	140	AC	1.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$26,437.50	\$26,437.50	\$3,701,250.00	0%	0%	\$3,701,250	P Previous Work	Developed by Anchor QEA (2010)
	Inspection and Monitoring of Transload Facility																
P34	Labor Inspections During Operations of Transload Facility	17.5	FTE	1.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$84,375.00	\$84,375.00	\$1,476,562.50	0%	0%	\$1,476,563	P Previous Work	Developed by Anchor QEA (2010)
P35	Environmental Monitoring During Offloading a Transload Facility	28	MO	1.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$16,875.00	\$16,875.00	\$472,500.00	0%	0%	\$472,500	P Previous Work	Developed by Anchor QEA (2010)
P36	Inspection and Monitoring Reporting for Transload Facility	7	YR	1.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$45,000.00	\$45,000.00	\$315,000.00	0%	0%	\$315,000	P Previous Work	Developed by Anchor QEA (2010)
												<b>TOTAL UNIT COST:</b>		\$14,447,813			
<div style="display: flex; justify-content: space-between;"> <div style="width: 60%;"> <b>Notes:</b>            HTRW productivity factor is from Exhibit B-3 or B-4 of "A Guide to Developing and Documenting Cost Estimates During the Feasibility Study", EPA 2000            The Cost Database Code is a reference code for linking with line item cost information with the cost source database and is not otherwise used within these cost worksheets.   <b>Source of Cost Data:</b>            NA Not Applicable - costs are from previous work or vendor quote            For citation references, the following sources apply:            MII (MII Assemblies), GSA (www.gsa.gov), FLC (www.flcdatcenter.com), A (Allowance), V (Vendor Quote), CW (Means CostWorks 2015), P (Previous Work), and FRTR (www.frtr.gov)         </div> <div style="width: 35%;"> <b>Abbreviations:</b>            QTY Quantity            EQUIP Equipment            MATL Material            HPF HTRW Productivity Factor            ADJ LABOR Adjusted Labor for HFP            ADJ EQUIP Adjusted Equipment for HFP            UNMOD UC Unmodified Unit Cost            UNMOD LIC Unmodified Line Item Cost            UNBUR LIC Unburdened Line Item Cost            PC OH Prime Contractor Overhead            PC PF Prime Contractor Profit            BUR LIC Burdened Line Item Cost             ACR Acres            BCY Bank Cubic Yard            CLF 100 Linear Foot            DY Days            EA Each            LF Linear Foot            HR Hours            LB Pounds            LCY Loose Cubic Yard            LS Lump Sum            RL Roll            SY Square Yard            TN Tons         </div> </div>																	
<div style="display: flex; justify-content: space-between;"> <div style="width: 45%;"> <b>Cost Adjustment Checklist:</b>            FACTOR:            H&amp;S Productivity (labor and equipment only)            Escalation to Base Year            Area Cost Factor            Subcontractor Overhead and Profit            Prime Contractor Overhead and Profit         </div> <div style="width: 50%;"> <b>NOTES:</b>            Field work will be in Level "D" PPE.            MII assembly costs include HPF adjustments.            2015 cost sources are not escalated (EF=1.00). All other costs are escalated based on the USACE CWCCIS, EM 1110-2-1304, Mar 2015.            An AF of 1.05 is used for Oregon, except that an AF of 1.00 (national unmodified average) is used for MII assembly costs and local vendor quotes.            It is assumed that home office OH is 8% and profit is 9% for the Prime Contractor. Professional labor overhead is 100%. Allowances and items with mandated costs such as per diem do not have overhead and profit applied.            Items previously developed by Anchor QEA (2010) already include contractor markups, therefore overhead and profit were not applied to those items.            It is assumed that OH is 1% and profit is 0% for vendor quotes for treatment and disposal at offsite disposal facilities. It is assumed that OH is 5% and profit is 0% for quotes for all other material vendor quotes.         </div> </div>																	

## TABLE CW-E22

Alternative E	Cost Worksheet: CW-E22	
---------------	------------------------	--

## COST WORKSHEET

<b>Site:</b>	Portland Harbor Superfund Site	<b>Prepared By:</b>	JN	<b>Date:</b>	7/27/2015
<b>Location:</b>	Portland, Oregon				
<b>Phase:</b>	Draft Feasibility Study	<b>Checked By:</b>	AS	<b>Date:</b>	7/28/2015
<b>Base Year:</b>	2015				

**Work Statement:**

This sub-element involves sampling as part of monitored natural recovery for MNR, EMNR, and Broadcast GAC areas. It includes costs for on-site labor, equipment, and materials developed from previous work.

**Cost Analysis:**

Cost for Monitored Natural Recovery for MNR/EMNR and Broadcast GAC Areas (Lump Sum)

COST DATABASE CODE	DESCRIPTION	QTY	UNIT(S)	HPF	LABOR	ADJ LABOR	EQUIP	ADJ EQUIP	MATL	OTHER	UNMOD UC	UNMOD LIC	PC OH	PC PF	BUR LIC	COST SOURCE CITATION	COMMENTS
P25	Monitored Natural Recovery	2,375	AC	1.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$3,679.79	\$3,679.79	\$8,739,489.38	0%	0%	\$8,739,489	P Previous Work	Developed by Anchor QEA (2010)
												TOTAL UNIT COST:		\$8,739,489			

Notes: \_\_\_\_\_ Abbreviations: \_\_\_\_\_

HTRW productivity factor is from Exhibit B-3 or B-4 of "A Guide to Developing and Documenting Cost Estimates During the Feasibility Study", EPA 2000		QTY	Quantity	ACR	Acre
--	--	-----	----------	-----	------

The Cost Database Code is a reference code for linking with line item cost information with the cost source database and is not otherwise used within these cost worksheets.

Source of Cost Data:	HPF	HTRW Productivity Factor	DY	Days
----------------------	-----	--------------------------	----	------

NA	Not Applicable - costs are from previous work or vendor quote	ADJ LABOR	Adjusted Labor for HFP	EA	Each
----	---	-----------	------------------------	----	------

For citation references, the following sources apply:

MI (MI Assemblies), GSA ([www.gsa.gov](http://www.gsa.gov)), FLC ([www.flcdatcenter.com](http://www.flcdatcenter.com)), A (Allowance), V (Vendor Quote), CW (Means CostWorks 2015), P (Previous Work), and FRTR ([www.frtr.gov](http://www.frtr.gov))

<u>Cost Adjustment Checklist:</u>	<u>NOTES:</u>	UNBUR LIC	Unburdened Line Item Cost	LCY	Loose Cubic Yard
-----------------------------------	---------------	-----------	---------------------------	-----	------------------

FACTOR:	Field work will be in Level "D" PPE.	PC OH	Prime Contractor Overhead	LS	Lump Sum
---------	--------------------------------------	-------	---------------------------	----	----------

H&S Productivity (labor and equipment only)	MII assembly costs include HPF adjustments.	PC PF	Prime Contractor Profit	RL	Roll
---	---	-------	-------------------------	----	------

Escalation to Base Year	2015 cost sources are not escalated (EF=1.00). All other costs are escalated based on the USACE WCWCIS, EM 1110-2-1304, Mar 2015.	BUR LIC	Burdened Line Item Cost	SY	Square Yard
-------------------------	---	---------	-------------------------	----	-------------

Area Cost Factor	An AF of 1.05 is used for Oregon, except that an AF of 1.00 (national unmodified average) is used for MII assembly costs and local vendor quotes.	TN	Tons
------------------	---	----	------

Subcontractor Overhead and Profit It is assumed that home office OH is 8% and profit is 9% for the Prime Contractor. Professional labor overhead is 100%. Allowances and items with mandated costs such as per diem do not have overhead and profit applied.

Prime Contractor Overhead and Profit Items previously developed by Anchor QEA (2010) already include contractor markups, therefore overhead and profit were not applied to those items.

**NOTES:**

Field work will be in Level "D" PPE.	PC OH	Prime Contractor Overhead	LS	Lump Sum
--------------------------------------	-------	---------------------------	----	----------

<p>III assembly costs include HPF adjustments.</p>	<p>PC PF Prime Contractor Profit</p>	<p>RL Roll</p>
--	--------------------------------------	----------------

2015 cost sources are not escalated (EF=1.00). All other costs are escalated based on the USACE CWCCIS, EM 1110-2-1304, Mar 2015.

An AF of 1.05 is used for Oregon, except that an AF of 1.00 (national unmodified average) is used for MII assembly costs and local vendor quotes.

It is assumed that home office OH is 8% and profit is 9% for the Prime Contractor. Professional labor overhead is 100%. Allowances and items with mandated costs such as per diem do not have overhead and profit applied.

Items previously developed by Anchor QEA (2010) already include contractor markups, therefore overhead and profit were not applied to those items.

It is assumed that OH is 1% and profit is 0% for vendor quotes for treatment and disposal at offsite disposal facilities. It is assumed that OH is 5% and profit is 0% for quotes for all other material vendor quotes.

**Abbreviations:**

QTY	Quantity	ACR	Acres
EQUIP	Equipment	BCY	Bank Cubic Yard
MATL	Material	CLF	100 Linear Foot
HPF	HTRW Productivity Factor	DY	Days
ADJ LABOR	Adjusted Labor for HFP	EA	Each
ADJ EQUIP	Adjusted Equipment for HFP	LF	Linear Foot
UNMOD UC	Unmodified Unit Cost	HR	Hours
UNMOD LIC	Unmodified Line Item Cost	LB	Pounds
UNBUR LIC	Unburdened Line Item Cost	LCY	Loose Cubic Yard
PC OH	Prime Contractor Overhead	LS	Lump Sum
PC PF	Prime Contractor Profit	RL	Roll
BUR LIC	Burdened Line Item Cost	SY	Square Yard

TABLE CW-E23

TABLE CW-E23																																																																							
<b>Alternative E</b> <b>Capital Cost Sub-Element</b> <b>Site-Wide Monitoring</b>										<b>Cost Worksheet: CW-E23</b>					COST WORKSHEET																																																								
<b>Site:</b> Portland Harbor Superfund Site <b>Location:</b> Portland, Oregon <b>Phase:</b> Draft Feasibility Study <b>Base Year:</b> 2015										<b>Prepared By:</b> JN <b>Checked By:</b> AS					<b>Date:</b> 7/27/2015 <b>Date:</b> 7/28/2015																																																								
<b>Work Statement:</b> This sub-element involves sampling, surveying, data management, and reporting as part of sitewide monitoring. It includes costs for on-site labor, equipment, and materials developed from previous work.																																																																							
<b>Cost Analysis:</b> Cost for Site-Wide Monitoring (Lump Sum)																																																																							
COST DATABASE CODE	DESCRIPTION	QTY	UNIT(S)	HPF	LABOR	ADJ LABOR	EQUIP	ADJ EQUIP	MATL	OTHER	UNMOD UC	UNMOD LIC	PC OH	PC PF	BUR LIC	COST SOURCE CITATION	COMMENTS																																																						
	Site-Wide Monitoring																																																																						
P26	Sitewide Monitoring	1	LS	1.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$955,959.75	\$955,959.75	\$955,959.75	0%	0%	\$955,960	P Previous Work	Includes onsite dust control and pavement washing																																																						
TOTAL UNIT COST:															\$955,960																																																								
<b>Notes:</b> HTRW productivity factor is from Exhibit B-3 or B-4 of "A Guide to Developing and Documenting Cost Estimates During the Feasibility Study", EPA 2000 The Cost Database Code is a reference code for linking with line item cost information with the cost source database and is not otherwise used within these cost worksheets.																																																																							
<b>Source of Cost Data:</b> NA Not Applicable - costs are from previous work or vendor quote For citation references, the following sources apply: MII (MII Assemblies), GSA (www.gsa.gov), FLC (www.flcdatcenter.com), A (Allowance), V (Vendor Quote), CW (Means CostWorks 2015), P (Previous Work), and FRTR (www.frtr.gov)										<b>Abbreviations:</b> <table style="width: 100%; border: none;"> <tr> <td style="width: 33%;">QTY</td> <td style="width: 33%;">Quantity</td> <td style="width: 33%;">ACR</td> <td style="width: 33%;">Acres</td> </tr> <tr> <td>EQUIP</td> <td>Equipment</td> <td>BCY</td> <td>Bank Cubic Yard</td> </tr> <tr> <td>MATL</td> <td>Material</td> <td>CLF</td> <td>100 Linear Foot</td> </tr> <tr> <td>HPF</td> <td>HTRW Productivity Factor</td> <td>DY</td> <td>Days</td> </tr> <tr> <td>ADJ LABOR</td> <td>Adjusted Labor for HFP</td> <td>EA</td> <td>Each</td> </tr> <tr> <td>ADJ EQUIP</td> <td>Adjusted Equipment for HFP</td> <td>LF</td> <td>Linear Foot</td> </tr> <tr> <td>UNMOD UC</td> <td>Unmodified Unit Cost</td> <td>HR</td> <td>Hours</td> </tr> <tr> <td>UNMOD LIC</td> <td>Unmodified Line Item Cost</td> <td>LB</td> <td>Pounds</td> </tr> <tr> <td>UNBUR LIC</td> <td>Unburdened Line Item Cost</td> <td>LCY</td> <td>Loose Cubic Yard</td> </tr> <tr> <td>PC OH</td> <td>Prime Contractor Overhead</td> <td>LS</td> <td>Lump Sum</td> </tr> <tr> <td>PC PF</td> <td>Prime Contractor Profit</td> <td>RL</td> <td>Roll</td> </tr> <tr> <td>BUR LIC</td> <td>Burdened Line Item Cost</td> <td>SY</td> <td>Square Yard</td> </tr> <tr> <td></td> <td></td> <td>TN</td> <td>Tons</td> </tr> </table>										QTY	Quantity	ACR	Acres	EQUIP	Equipment	BCY	Bank Cubic Yard	MATL	Material	CLF	100 Linear Foot	HPF	HTRW Productivity Factor	DY	Days	ADJ LABOR	Adjusted Labor for HFP	EA	Each	ADJ EQUIP	Adjusted Equipment for HFP	LF	Linear Foot	UNMOD UC	Unmodified Unit Cost	HR	Hours	UNMOD LIC	Unmodified Line Item Cost	LB	Pounds	UNBUR LIC	Unburdened Line Item Cost	LCY	Loose Cubic Yard	PC OH	Prime Contractor Overhead	LS	Lump Sum	PC PF	Prime Contractor Profit	RL	Roll	BUR LIC	Burdened Line Item Cost	SY	Square Yard			TN	Tons
QTY	Quantity	ACR	Acres																																																																				
EQUIP	Equipment	BCY	Bank Cubic Yard																																																																				
MATL	Material	CLF	100 Linear Foot																																																																				
HPF	HTRW Productivity Factor	DY	Days																																																																				
ADJ LABOR	Adjusted Labor for HFP	EA	Each																																																																				
ADJ EQUIP	Adjusted Equipment for HFP	LF	Linear Foot																																																																				
UNMOD UC	Unmodified Unit Cost	HR	Hours																																																																				
UNMOD LIC	Unmodified Line Item Cost	LB	Pounds																																																																				
UNBUR LIC	Unburdened Line Item Cost	LCY	Loose Cubic Yard																																																																				
PC OH	Prime Contractor Overhead	LS	Lump Sum																																																																				
PC PF	Prime Contractor Profit	RL	Roll																																																																				
BUR LIC	Burdened Line Item Cost	SY	Square Yard																																																																				
		TN	Tons																																																																				
<b>Cost Adjustment Checklist:</b> FACTOR: H&S Productivity (labor and equipment only) Escalation to Base Year Area Cost Factor Subcontractor Overhead and Profit Prime Contractor Overhead and Profit										<b>NOTES:</b> Field work will be in Level "D" PPE. MII assembly costs include HPF adjustments. 2015 cost sources are not escalated (EF=1.00). All other costs are escalated based on the USACE CWCCIS, EM 1110-2-1304, Mar 2015. An AF of 1.05 is used for Oregon, except that an AF of 1.00 (national unmodified average) is used for MII assembly costs and local vendor quotes. It is assumed that home office OH is 8% and profit is 9% for the Prime Contractor. Professional labor overhead is 100%. Allowances and items with mandated costs such as per diem do not have overhead and profit applied. Items previously developed by Anchor QEA (2010) already include contractor markups, therefore overhead and profit were not applied to those items. It is assumed that OH is 1% and profit is 0% for vendor quotes for treatment and disposal at offsite disposal facilities. It is assumed that OH is 5% and profit is 0% for quotes for all other material vendor quotes.																																																													

TABLE CW-E24

<div style="display: flex; justify-content: space-between;"> <span>Alternative E</span> <span>Cost Worksheet: CW-E24</span> </div> <div style="display: flex; justify-content: space-between; margin-top: 5px;"> <span>Capital Cost Sub-Element</span> <span><b>COST WORKSHEET</b></span> </div> <div style="display: flex; justify-content: space-between; margin-top: 5px;"> <span>Cap Area Monitoring and Reactive Layer Monitoring</span> </div>																			
<b>Site:</b> Portland Harbor Superfund Site <b>Location:</b> Portland, Oregon <b>Phase:</b> Draft Feasibility Study <b>Base Year:</b> 2015												<b>Prepared By:</b> JN  <b>Checked By:</b> AS		<b>Date:</b> 7/27/2015  <b>Date:</b> 7/28/2015					
<b>Work Statement:</b> This sub-element involves sampling, surveying, data management, and reporting as part of cap and reactive layer monitoring. It includes costs for on-site labor, equipment, and materials developed from previous work.																			
<b>Cost Analysis:</b> Cost for Cap and Reactive Layer Monitoring (Lump Sum)																			
COST DATABASE CODE	DESCRIPTION	QTY	UNIT(S)	HPF	LABOR	ADJ LABOR	EQUIP	ADJ EQUIP	MATL	OTHER	UNMOD UC	UNMOD LIC	PC OH	PC PF	BUR LIC	COST SOURCE CITATION	COMMENTS		
	Cap Area Monitoring																		
P27	Cap Monitoring	212	AC	1.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$78,821.21	\$78,821.21	\$16,717,979.17	0%	0%	\$16,717,979	P Previous Work	Developed by Anchor QEA (2010)		
	Reactive Layer Monitoring																		
P28	Reactive Layer Monitoring	200.1	AC	1.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$88,810.88	\$88,810.88	\$17,771,056.09	0%	0%	\$17,771,056	P Previous Work	Developed by Anchor QEA (2010)		
												<b>TOTAL UNIT COST:</b>		\$34,489,035					
<b>Notes:</b> HTRW productivity factor is from Exhibit B-3 or B-4 of "A Guide to Developing and Documenting Cost Estimates During the Feasibility Study", EPA 2000 The Cost Database Code is a reference code for linking with line item cost information with the cost source database and is not otherwise used within these cost worksheets.																			
<b>Source of Cost Data:</b> NA Not Applicable - costs are from previous work or vendor quote For citation references, the following sources apply: MII (MII Assemblies), GSA (www.gsa.gov), FLC (www.flcdatabase.com), A (Allowance), V (Vendor Quote), CW (Means CostWorks 2015), P (Previous Work), and FRTR (www.frtr.gov)																			
<b>Cost Adjustment Checklist:</b> FACTOR: Field work will be in Level "D" PPE. H&S Productivity (labor and equipment only) MII assembly costs include HPF adjustments. Escalation to Base Year 2015 cost sources are not escalated (EF=1.00). All other costs are escalated based on the USACE CWCCIS, EM 1110-2-1304, Mar 2015. Area Cost Factor An AF of 1.05 is used for Oregon, except that an AF of 1.00 (national unmodified average) is used for MII assembly costs and local vendor quotes. Subcontractor Overhead and Profit It is assumed that home office OH is 8% and profit is 9% for the Prime Contractor. Professional labor overhead is 100%. Allowances and items with mandated costs such as per diem do not have overhead and profit applied. Prime Contractor Overhead and Profit Items previously developed by Anchor QEA (2010) already include contractor markups, therefore overhead and profit were not applied to those items. It is assumed that OH is 1% and profit is 0% for vendor quotes for treatment and disposal at offsite disposal facilities. It is assumed that OH is 5% and profit is 0% for quotes for all other material vendor quotes.																			
<b>Abbreviations:</b> <div style="display: flex; justify-content: space-between;"> <div>           QTY Quantity            EQUIP Equipment            MATL Material            HPF HTRW Productivity Factor            ADJ LABOR Adjusted Labor for HFP            ADJ EQUIP Adjusted Equipment for HFP            UNMOD UC Unmodified Unit Cost            UNMOD LIC Unmodified Line Item Cost            UNBUR LIC Unburdened Line Item Cost            PC OH Prime Contractor Overhead            PC PF Prime Contractor Profit            BUR LIC Burdened Line Item Cost         </div> <div>           ACR Acres            BCY Bank Cubic Yard            CLF 100 Linear Foot            DY Days            EA Each            LF Linear Foot            HR Hours            LB Pounds            LCY Loose Cubic Yard            LS Lump Sum            RL Roll            SY Square Yard            TN Tons         </div> </div>																			

TABLE CW-E25

Alternative E Cost Worksheet: CW-E25

## Capital Cost Sub-Element

## Long-Term Maintenance for Capping, EMNR, and In Situ Treatment

## COST WORKSHEET

Site: Portland Harbor Superfund Site  
 Location: Portland, Oregon  
 Phase: Draft Feasibility Study  
 Base Year: 2015

Prepared By: AB Date: 8/11/2015

Checked By: JN Date: 8/12/2015

## Work Statement:

This sub-element involves replacement of 5% of the technology assignment layers as part of long-term maintenance. It includes costs for on-site labor, equipment, and materials developed from previous work.

## Cost Analysis:

Cost for Long-Term Maintenance (Lump Sum)

COST DATABASE CODE	DESCRIPTION	QTY	UNIT(S)	HPF	LABOR	ADJ LABOR	EQUIP	ADJ EQUIP	MATL	OTHER	UNMOD UC	UNMOD LIC	PC OH	PC PF	BUR LIC	COST SOURCE CITATION	COMMENTS
<b>Mobilization / Demobilization</b>																	
M16	Mobilization/Demobilization for Long Term Maintenance	1	LS	1.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$154,055.80	\$154,055.80	\$154,055.80	0%	0%	\$154,056	A Previous Work	Assumes 1.6% of total capital costs per Lower Duwamish. See Calculations for derivation.
<b>Sand Placement for Technology Assignments</b>																	
<b>Sand Placement (Riverbanks)</b>																	
P2	Sand Placement (Confined)	2,520	LCY	1.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$49.01	\$49.01	\$123,492.60	0%	0%	\$123,493	P Previous Work	Assume 5% of placement of additional material
M1	Sand	2,520	LCY	1.00	\$0.00	\$0.00	\$0.00	\$0.00	\$19.71	\$0.00	\$19.71	\$49,669.20	0%	0%	\$49,669	P Previous Work	Assume 5% of placement of additional material
<b>Sand Placement (Confined)</b>																	
P2	Sand Placement (Confined)	4,521	LCY	1.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$49.01	\$49.01	\$221,551.61	0%	0%	\$221,552	P Previous Work	Assume 5% of placement of additional material
M1	Sand	4,521	LCY	1.00	\$0.00	\$0.00	\$0.00	\$0.00	\$19.71	\$0.00	\$19.71	\$89,108.91	0%	0%	\$89,109	P Previous Work	Assume 5% of placement of additional material
<b>Sand Placement (Open Water)</b>																	
P6	Sand Placement (Open Water)	31,079	LCY	1.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$23.76	\$23.76	\$738,437.04	0%	0%	\$738,437	P Previous Work	Assume 5% of placement of additional material
M1	Sand	31,079	LCY	1.00	\$0.00	\$0.00	\$0.00	\$0.00	\$19.71	\$0.00	\$19.71	\$612,567.09	0%	0%	\$612,567	P Previous Work	Assume 5% of placement of additional material
<b>Beach Mix Placement for Technology Assignments</b>																	
<b>Beach Mix Placement (Riverbanks)</b>																	
P5	Beach Mix Placement (Confined)	448	LCY	1.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$58.50	\$58.50	\$26,208.00	0%	0%	\$26,208	P Previous Work	Assume 5% of placement of additional material
M5	ODOT 100 Beach Mix	448	LCY	1.00	\$0.00	\$0.00	\$0.00	\$0.00	\$57.59	\$0.00	\$57.59	\$25,800.32	0%	0%	\$25,800	P Previous Work	Assume 5% of placement of additional material
<b>Beach Mix Placement (Confined)</b>																	
P5	Beach Mix Placement (Confined)	154	LCY	1.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$58.50	\$58.50	\$9,009.00	0%	0%	\$9,009	P Previous Work	Assume 5% of placement of additional material
M5	ODOT 100 Beach Mix	154	LCY	1.00	\$0.00	\$0.00	\$0.00	\$0.00	\$57.59	\$0.00	\$57.59	\$8,868.86	0%	0%	\$8,869	P Previous Work	Assume 5% of placement of additional material
<b>Beach Mix Placement (Open Water)</b>																	
P39	Beach Mix Placement (Open Water)	1,165	LCY	1.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$28.34	\$28.34	\$33,014.64	0%	0%	\$33,015	P Previous Work	Assume 5% of placement of additional material
M5	ODOT 100 Beach Mix	1,165	LCY	1.00	\$0.00	\$0.00	\$0.00	\$0.00	\$57.59	\$0.00	\$57.59	\$67,092.35	0%	0%	\$67,092	P Previous Work	Assume 5% of placement of additional material
<b>Armor Placement for Technology Assignments</b>																	
<b>Armor Placement (Riverbanks)</b>																	
P3	ODOT 200 Placement (Confined)	379	LCY	1.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$58.50	\$58.50	\$22,171.50	0%	0%	\$22,172	P Previous Work	Assume 5% of placement of additional material
M2	ODOT 200 Armor	379	LCY	1.00	\$0.00	\$0.00	\$0.00	\$0.00	\$57.59	\$0.00	\$57.59	\$21,826.61	0%	0%	\$21,827	P Previous Work	Assume 5% of placement of additional material
<b>Armor Placement (Confined)</b>																	
P3	ODOT 200 Placement (Confined)	1,037	LCY	1.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$58.50	\$58.50	\$60,664.50	0%	0%	\$60,665	P Previous Work	Assume 5% of placement of additional material
M2	ODOT 200 Armor	1,037	LCY	1.00	\$0.00	\$0.00	\$0.00	\$0.00	\$57.59	\$0.00	\$57.59	\$59,720.83	0%	0%	\$59,721	P Previous Work	Assume 5% of placement of additional material
<b>Armor Placement (Open Water)</b>																	
P7	ODOT 200 Placement (Open Water)	2,003	LCY	1.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$28.34	\$28.34	\$56,762.52	0%	0%	\$56,763	P Previous Work	Assume 5% of placement of additional material
M2	ODOT 200 Armor	2,003	LCY	1.00	\$0.00	\$0.00	\$0.00	\$0.00	\$57.59	\$0.00	\$57.59	\$115,352.77	0%	0%	\$115,353	P Previous Work	Assume 5% of placement of additional material
<b>Reactive/GAC Placement for Technology Assignments</b>																	
<b>Reactive/GAC Placement (Riverbanks)</b>																	
P40	Carbon (AquaGate + PAC 5%) Placement (Confined)	46	TON	1.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$816.75	\$816.75	\$37,570.50	0%	0%	\$37,571	P Previous Work	Assume 5% of placement of additional material
M4	Carbon (AquaGate + PAC 5%)	46	TON	1.00	\$0.00	\$0.00	\$0.00	\$0.00	\$8,000.00	\$0.00	\$8,000.00	\$368,000.00	5%	0%	\$386,400	V Vendor Quote	Assume 5% of placement of additional material
<b>Reactive/GAC Placement (Confined)</b>																	
P40	Carbon (AquaGate + PAC 5%) Placement (Confined)	73	TON	1.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$816.75	\$816.75	\$59,622.75	0%	0%	\$59,623	P Previous Work	Assume 5% of placement of additional material
M4	Carbon (AquaGate + PAC 5%)	73	TON	1.00	\$0.00	\$0.00	\$0.00	\$0.00	\$8,000.00	\$0.00	\$8,000.00	\$584,000.00	5%	0%	\$613,200	V Vendor Quote	Assume 5% of placement of additional material
<b>Reactive/GAC Placement (Open Water)</b>																	
P41	Carbon (AquaGate + PAC 5%) Placement (Open Water)	652	TON	1.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$396.00	\$396.00	\$258,192.00	0%	0%	\$258,192	P Previous Work	Assume 5% of placement of additional material
M4	Carbon (AquaGate + PAC 5%)	652	TON	1.00	\$0.00	\$0.00	\$0.00	\$0.00	\$8,000.00	\$0.00	\$8,000.00	\$5,216,000.00	5%	0%	\$5,476,800	V Vendor Quote	Assume 5% of placement of additional material

TABLE CW-E25

<b>Alternative E</b> <b>Cost Worksheet: CW-E25</b>																		<b>COST WORKSHEET</b>	
<b>Capital Cost Sub-Element</b> <b>Long-Term Maintenance for Capping, EMNR, and In Situ Treatment</b>																		<b>Prepared By: AB</b> <b>Date: 8/11/2015</b>	
<b>Site:</b> Portland Harbor Superfund Site <b>Location:</b> Portland, Oregon <b>Phase:</b> Draft Feasibility Study <b>Base Year:</b> 2015																		<b>Checked By: JN</b> <b>Date: 8/12/2015</b>	
<b>Work Statement:</b> This sub-element involves replacement of 5% of the technology assignment layers as part of long-term maintenance. It includes costs for on-site labor, equipment, and materials developed from previous work.																			
<b>Cost Analysis:</b> Cost for Long-Term Maintenance (Lump Sum)																			
COST DATABASE CODE	DESCRIPTION	QTY	UNIT(S)	HPF	LABOR	ADJ LABOR	EQUIP	ADJ EQUIP	MATL	OTHER	UNMOD UC	UNMOD LIC	PC OH	PC PF	BUR LIC	COST SOURCE CITATION	COMMENTS		
<b>Geofabric for Riverbanks</b>																			
P51	Geotextile Installation	0.9	AC	1.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$7,060.20	\$7,060.20	\$6,354.18	8%	9%	\$7,480	P Previous Work			
M13	Geotextile	0.9	AC	1.00	\$0.00	\$0.00	\$0.00	\$0.00	\$5,687.39	\$0.00	\$5,687.39	\$5,118.65	5%	0%	\$5,375	V Vendor Quote	Assume 5% of placement of additional material		
<b>Organoclay Mat Placement for Technology Assignments</b>																			
P23	Organoclay Mat Placement (Riverbanks) (Confined)	2,178	SF	1.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$23.74	\$23.74	\$51,700.28	0%	0%	\$51,700	P Previous Work	Assume 5% of placement of additional material		
P23	Organoclay Mat Placement (Confined) (Confined)	6,970	SF	1.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$23.74	\$23.74	\$165,450.38	0%	0%	\$165,450	P Previous Work	Assume 5% of placement of additional material		
P24	Organoclay Mat Placement (Open Water) (Open)	31,799	SF	1.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$7.09	\$7.09	\$225,375.41	0%	0%	\$225,375	P Previous Work	Assume 5% of placement of additional material		
												<b>TOTAL UNIT COST:</b>		<b>\$9,782,543</b>					
<b>Notes:</b> HTRW productivity factor is from Exhibit B-3 or B-4 of "A Guide to Developing and Documenting Cost Estimates During the Feasibility Study", EPA 2000 The Cost Database Code is a reference code for linking with line item cost information with the cost source database and is not otherwise used within these cost worksheets.																			
<b>Source of Cost Data:</b> NA Not Applicable - costs are from previous work or vendor quote For citation references, the following sources apply: MII (MII Assemblies), GSA (www.gsa.gov), FLC (www.flcdatcenter.com), A (Allowance), V (Vendor Quote), CW (Means CostWorks 2015), P (Previous Work), and FRTR (www.frtr.gov)																			
<b>Cost Adjustment Checklist:</b> FACTOR: H&S Productivity (labor and equipment only) Escalation to Base Year Area Cost Factor Subcontractor Overhead and Profit Prime Contractor Overhead and Profit																			
<b>NOTES:</b> Field work will be in Level "D" PPE. MII assembly costs include HPF adjustments. 2015 cost sources are not escalated (EF=1.00). All other costs are escalated based on the USACE CWCCIS, EM 1110-2-1304, Mar 2015. An AF of 1.05 is used for Oregon, except that an AF of 1.00 (national unmodified average) is used for MII assembly costs and local vendor quotes. It is assumed that home office OH is 8% and profit is 9% for the Prime Contractor. Professional labor overhead is 100%. Allowances and items with mandated costs such as per diem do not have overhead and profit applied. Items previously developed by Anchor QEA (2010) already include contractor markups, therefore overhead and profit were not applied to those items. It is assumed that OH is 1% and profit is 0% for vendor quotes for treatment and disposal at offsite disposal facilities. It is assumed that OH is 5% and profit is 0% for quotes for all other material vendor quotes.																			
<b>Abbreviations:</b> QTY Quantity EQUIP Equipment MATL Material HPF HTRW Productivity Factor ADJ LABOR Adjusted Labor for HFP ADJ EQUIP Adjusted Equipment for HFP UNMOD UC Unmodified Unit Cost UNMOD LIC Unmodified Line Item Cost UNBUR LIC Unburdened Line Item Cost PC OH Prime Contractor Overhead PC PF Prime Contractor Profit BUR LIC Burdened Line Item Cost ACR Acres BCY Bank Cubic Yard CLF 100 Linear Foot DY Days EA Each LF Linear Foot HR Hours LB Pounds LCY Loose Cubic Yard LS Lump Sum RL Roll SY Square Yard TN Tons																			

TABLE CW-E26

**Alternative E**  
**Capital Cost Sub-Element**  
**5-Year Site Review**

**Cost Worksheet: CW-E26**

**COST WORKSHEET**

**Site:** Portland Harbor Superfund Site  
**Location:** Portland, Oregon  
**Phase:** Draft Feasibility Study  
**Base Year:** 2015

**Prepared By:** JN **Date:** 7/27/2015

**Checked By:** AS **Date:** 7/28/2015

**Work Statement:**

This sub-element involves the site visit and 5-year site review report. The following cost includes labor, material and shipping costs for site visits and 5-year site review reports.

**Cost Analysis:**

Cost for 5-Year Site Review (Lump Sum)

COST DATABASE CODE	DESCRIPTION	QTY	UNIT(S)	HPF	LABOR	ADJ LABOR	EQUIP	ADJ EQUIP	MATL	OTHER	UNMOD UC	UNMOD LIC	PC OH	PC PF	BUR LIC	COST SOURCE CITATION	COMMENTS
L11	Project Manager	300	HR	1.00	\$82.17	\$82.17	\$0.00	\$0.00	\$0.00	\$0.00	\$82.17	\$24,651.00	100%	9%	\$53,739	FLC FLCDataCenter	
L4	Environmental Engineer	600	HR	1.00	\$48.91	\$48.91	\$0.00	\$0.00	\$0.00	\$0.00	\$48.91	\$29,346.00	100%	9%	\$63,974	FLC FLCDataCenter	
L6	Environmental Scientist	900	HR	1.00	\$37.70	\$37.70	\$0.00	\$0.00	\$0.00	\$0.00	\$37.70	\$33,930.00	100%	9%	\$73,967	FLC FLCDataCenter	
L12	Quality Control Engineer	120	HR	1.00	\$64.99	\$64.99	\$0.00	\$0.00	\$0.00	\$0.00	\$64.99	\$7,798.80	100%	9%	\$17,001	FLC FLCDataCenter	
L1	CAD Drafter	300	HR	1.00	\$31.31	\$31.31	\$0.00	\$0.00	\$0.00	\$0.00	\$31.31	\$9,393.00	100%	9%	\$20,477	FLC FLCDataCenter	
L3	Clerks, Typist, Bookkeeper & Receptionist	300	HR	1.00	\$19.89	\$19.89	\$0.00	\$0.00	\$0.00	\$0.00	\$19.89	\$5,967.00	100%	9%	\$13,008	FLC FLCDataCenter	
M14	Copy and Shipping Allowance	1	LS	1.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$1,500.00	\$1,500.00	\$1,500.00	0%	0%	\$1,500	A Allowance	
<b>TOTAL UNIT COST:</b>															<b>\$243,666</b>		

**Notes:**

HTRW productivity factor is from Exhibit B-3 or B-4 of "A Guide to Developing and Documenting Cost Estimates During the Feasibility Study", EPA 2000

The Cost Database Code is a reference code for linking with line item cost information with the cost source database and is not otherwise used within these cost worksheets.

**Source of Cost Data:**

NA Not Applicable - costs are from previous work or vendor quote

For citation references, the following sources apply:

MII (MII Assemblies), GSA (www.gsa.gov), FLC (www.flcdatacenter.com), A (Allowance), V (Vendor Quote), CW (Means CostWorks 2015), P (Previous Work), and FRTR (www.ftr.gov)

**Cost Adjustment Checklist:**

FACTOR:

H&S Productivity (labor and equipment only)

Escalation to Base Year

Area Cost Factor

Subcontractor Overhead and Profit

Prime Contractor Overhead and Profit

**NOTES:**

Field work will be in Level "D" PPE.

MII assembly costs include HPF adjustments.

2015 cost sources are not escalated (EF=1.00). All other costs are escalated based on the USACE CWCCIS, EM 1110-2-1304, Mar 2015.

An AF of 1.05 is used for Oregon, except that an AF of 1.00 (national unmodified average) is used for MII assembly costs and local vendor quotes.

It is assumed that home office OH is 8% and profit is 9% for the Prime Contractor. Professional labor overhead is 100%. Allowances and items with mandated costs such as per diem do not have overhead and profit applied.

Items previously developed by Anchor QEA (2010) already include contractor markups, therefore overhead and profit were not applied to those items.

It is assumed that OH is 1% and profit is 0% for vendor quotes for treatment and disposal at offsite disposal facilities. It is assumed that OH is 5% and profit is 0% for quotes for all other material vendor quotes.

**Abbreviations:**

QTY	Quantity	ACR	Acres
EQUIP	Equipment	BCY	Bank Cubic Yard
MATL	Material	CLF	100 Linear Foot
HPF	HTRW Productivity Factor	DY	Days
ADJ LABOR	Adjusted Labor for HFP	EA	Each
ADJ EQUIP	Adjusted Equipment for HFP	LF	Linear Foot
UNMOD UC	Unmodified Unit Cost	HR	Hours
UNMOD LIC	Unmodified Line Item Cost	LB	Pounds
UNBUR LIC	Unburdened Line Item Cost	LCY	Loose Cubic Yard
PC OH	Prime Contractor Overhead	LS	Lump Sum
PC PF	Prime Contractor Profit	RL	Roll
BUR LIC	Burdened Line Item Cost	SY	Square Yard
		TN	Tons



**Cost Worksheets**  
**Alternative F**

TABLE CW-F1

**Alternative F**  
**Capital Cost Sub-Element**  
**Mobilization / Demobilization**

**Cost Worksheet: CW-F1**

**COST WORKSHEET**

**Site:** Portland Harbor Superfund Site  
**Location:** Portland, Oregon  
**Phase:** Draft Feasibility Study  
**Base Year:** 2015

**Prepared By:** AB **Date:** 8/11/2015

**Checked By:** JN **Date:** 8/12/2015

**Work Statement:**

This sub-element involves mobilization and demobilization of all the required equipment to and from the site respectively.

**Cost Analysis:**

Cost for Mobilization/Demobilization (Lump Sum)

COST DATABASE CODE	DESCRIPTION	QTY	UNIT(S)	HPF	LABOR	ADJ LABOR	EQUIP	ADJ EQUIP	MATL	OTHER	UNMOD UC	UNMOD LIC	PC OH	PC PF	BUR LIC	COST SOURCE CITATION	COMMENTS
M15	Mobilization/Demobilization	1	LS	1.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$29,139,000.00	\$29,139,000.00	\$29,139,000.00	0%	0%	\$29,139,000	A Previous Work	Assumes 1.6% of total capital costs per Lower Duwamish. See Calculations for derivation.
<b>TOTAL UNIT COST:</b>															\$29,139,000		

**Notes:**

HTRW productivity factor is from Exhibit B-3 or B-4 of "A Guide to Developing and Documenting Cost Estimates During the Feasibility Study", EPA 2000

The Cost Database Code is a reference code for linking with line item cost information with the cost source database and is not otherwise used within these cost worksheets.

**Source of Cost Data:**

NA Not Applicable - costs are from previous work or vendor quote

For citation references, the following sources apply:

MII (MII Assemblies), GSA (www.gsa.gov), FLC (www.flcdatcenter.com), A (Allowance), V (Vendor Quote), CW (Means CostWorks 2015), P (Previous Work), and FRTR (www.frtr.gov)

**Cost Adjustment Checklist:**

**FACTOR:**  
H&S Productivity (labor and equipment only)  
Escalation to Base Year  
Area Cost Factor  
Subcontractor Overhead and Profit  
Prime Contractor Overhead and Profit

**NOTES:**

Field work will be in Level "D" PPE.

MII assembly costs include HPF adjustments.

2015 cost sources are not escalated (EF=1.00). All other costs are escalated based on the USACE CWCCIS, EM 1110-2-1304, Mar 2015.

An AF of 1.05 is used for Oregon, except that an AF of 1.00 (national unmodified average) is used for MII assembly costs and local vendor quotes.

It is assumed that home office OH is 8% and profit is 9% for the Prime Contractor. Professional labor overhead is 100%. Allowances and items with mandated costs such as per diem do not have overhead and profit applied.

Items previously developed by Anchor QEA (2010) already include contractor markups, therefore overhead and profit were not applied to those items.

It is assumed that OH is 1% and profit is 0% for vendor quotes for treatment and disposal at offsite disposal facilities. It is assumed that OH is 5% and profit is 0% for quotes for all other material vendor quotes.

**Abbreviations:**

QTY	Quantity	ACR	Acres
EQUIP	Equipment	BCY	Bank Cubic Yard
MATL	Material	CLF	100 Linear Foot
HPF	HTRW Productivity Factor	DY	Days
ADJ LABOR	Adjusted Labor for HFP	EA	Each
ADJ EQUIP	Adjusted Equipment for HFP	LF	Linear Foot
UNMOD UC	Unmodified Unit Cost	HR	Hours
UNMOD LIC	Unmodified Line Item Cost	LB	Pounds
UNBUR LIC	Unburdened Line Item Cost	LCY	Loose Cubic Yard
PC OH	Prime Contractor Overhead	LS	Lump Sum
PC PF	Prime Contractor Profit	RL	Roll
BUR LIC	Burdened Line Item Cost	SY	Square Yard
		TN	Tons

TABLE CW-F2

**Alternative F**  
**Capital Cost Sub-Element**  
**Institutional Controls**

**Cost Worksheet: CW-F2**

# **COST WORKSHEET**

**Site:** Portland Harbor Superfund Site  
**Location:** Portland, Oregon  
**Phase:** Draft Feasibility Study  
**Base Year:** 2015

**Prepared By:** JN

**Date:** 7/27/2015

**Checked By:** AS

**Date:** 7/28/2015

**Work Statement:**

This sub-element involves implementation of institutional controls for the site. The following cost includes labor and materials to develop legal documents for institutional controls and cost for document submission and recording.

**Cost Analysis:**

Cost for Institutional Controls (Lump Sum)

COST DATABASE CODE	DESCRIPTION	QTY	UNIT(S)	HPF	LABOR	ADJ LABOR	EQUIP	ADJ EQUIP	MATL	OTHER	UNMOD UC	UNMOD LIC	PC OH	PC PF	BUR LIC	COST SOURCE CITATION	COMMENTS
	<b>Informational Devices - Fish Consumption Advisory</b>																
L11	Project Manager	800	HR	1.00	\$82.17	\$82.17	\$0.00	\$0.00	\$0.00	\$0.00	\$82.17	\$65,736.00	100%	9%	\$143,304	FLC FLCDataCenter	
L4	Environmental Engineer	500	HR	1.00	\$48.91	\$48.91	\$0.00	\$0.00	\$0.00	\$0.00	\$48.91	\$24,455.00	100%	9%	\$53,312	FLC FLCDataCenter	
L6	Environmental Scientist	800	HR	1.00	\$37.70	\$37.70	\$0.00	\$0.00	\$0.00	\$0.00	\$37.70	\$30,160.00	100%	9%	\$65,749	FLC FLCDataCenter	
L3	Clerks, Typist, Bookkeeper & Receptionist	300	HR	1.00	\$19.89	\$19.89	\$0.00	\$0.00	\$0.00	\$0.00	\$19.89	\$5,967.00	100%	9%	\$13,008	FLC FLCDataCenter	
L5	Environmental Lawyer	150	HR	1.00	\$71.72	\$71.72	\$0.00	\$0.00	\$0.00	\$0.00	\$71.72	\$10,758.00	100%	9%	\$23,452	FLC FLCDataCenter	
L13	Paralegal	300	HR	1.00	\$29.56	\$29.56	\$0.00	\$0.00	\$0.00	\$0.00	\$29.56	\$8,868.00	100%	9%	\$19,332	FLC FLCDataCenter	
	<b>Informational Devices - Regulated Navigation Area (RNA) Setup</b>																
L11	Project Manager	150	HR	1.00	\$82.17	\$82.17	\$0.00	\$0.00	\$0.00	\$0.00	\$82.17	\$12,325.50	100%	9%	\$26,870	FLC FLCDataCenter	
L4	Environmental Engineer	100	HR	1.00	\$48.91	\$48.91	\$0.00	\$0.00	\$0.00	\$0.00	\$48.91	\$4,891.00	100%	9%	\$10,662	FLC FLCDataCenter	
L5	Environmental Lawyer	80	HR	2.00	\$71.72	\$35.86	\$0.00	\$0.00	\$0.00	\$0.00	\$35.86	\$2,868.80	100%	9%	\$6,254	FLC FLCDataCenter	
L13	Paralegal	160	HR	1.00	\$29.56	\$29.56	\$0.00	\$0.00	\$0.00	\$0.00	\$29.56	\$4,729.60	100%	9%	\$10,311	FLC FLCDataCenter	
A1	18' Boat	80	HR	1.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$28.02	\$28.02	\$2,241.60	8%	9%	\$2,639	MII MII Assembly	For buoy setup
L17	Boat Operator	80	HR	1.00	\$33.16	\$33.16	\$0.00	\$0.00	\$0.00	\$0.00	\$33.16	\$2,652.80	100%	9%	\$5,783	FLC FLCDataCenter	
L8	Field Technician	80	HR	1.00	\$31.42	\$31.42	\$0.00	\$0.00	\$0.00	\$0.00	\$31.42	\$2,513.60	100%	9%	\$5,480	FLC FLCDataCenter	
M21	Buoy	120	EA	1.00	\$0.00	\$0.00	\$0.00	\$0.00	\$421.76	\$0.00	\$421.76	\$50,611.20	5%	0%	\$53,142	V Vendor Quote	Quote - Go2Marine
	<b>Proprietary Controls</b>																
L5	Environmental Lawyer	200	HR	1.00	\$71.72	\$71.72	\$0.00	\$0.00	\$0.00	\$0.00	\$71.72	\$14,344.00	100%	9%	\$31,270	FLC FLCDataCenter	
L13	Paralegal	250	HR	1.00	\$29.56	\$29.56	\$0.00	\$0.00	\$0.00	\$0.00	\$29.56	\$7,390.00	100%	9%	\$16,110	FLC FLCDataCenter	
L3	Clerks, Typist, Bookkeeper & Receptionist	150	HR	1.00	\$19.89	\$19.89	\$0.00	\$0.00	\$0.00	\$0.00	\$19.89	\$2,983.50	100%	9%	\$6,504	FLC FLCDataCenter	
	<b>Enforcement Tools</b>																
L5	Environmental Lawyer	4,200	HR	1.00	\$71.72	\$71.72	\$0.00	\$0.00	\$0.00	\$0.00	\$71.72	\$301,224.00	100%	9%	\$656,668	FLC FLCDataCenter	
L13	Paralegal	5,250	HR	1.00	\$29.56	\$29.56	\$0.00	\$0.00	\$0.00	\$0.00	\$29.56	\$155,190.00	100%	9%	\$338,314	FLC FLCDataCenter	
L3	Clerks, Typist, Bookkeeper & Receptionist	2,100	HR	1.00	\$19.89	\$19.89	\$0.00	\$0.00	\$0.00	\$0.00	\$19.89	\$41,769.00	100%	9%	\$91,056	FLC FLCDataCenter	
<b>TOTAL UNIT COST:</b>															<b>\$1,579,220</b>		

**Notes:**

HTRW productivity factor is from Exhibit B-3 or B-4 of "A Guide to Developing and Documenting Cost Estimates During the Feasibility Study", EPA 2000

The Cost Database Code is a reference code for linking with line item cost information with the cost source database and is not otherwise used within these cost worksheets.

**Source of Cost Data:**

NA Not Applicable - costs are from previous work or vendor quote

For citation references, the following sources apply:

MII (MII Assemblies), GSA (www.gsa.gov), FLC (www.flcdatacenter.com), A (Allowance), V (Vendor Quote), CW (Means CostWorks 2015), P (Previous Work), and FRTR (www.frtr.org)

**Cost Adjustment Checklist:**

FACTOR:

H&S Productivity (labor and equipment only)

Escalation to Base Year

Area Cost Factor

Subcontractor Overhead and Profit

Prime Contractor Overhead and Profit

**NOTES:**

Field work will be in Level "D" PPE.

MII assembly costs include HPF adjustments.

2015 cost sources are not escalated (EF=1.00). All other costs are escalated based on the USACE WCCIS, EM 1110-2-1304, Mar 2015.

An AF of 1.05 is used for Oregon, except that an AF of 1.00 (national unmodified average) is used for MII assembly costs and local vendor quotes.

It is assumed that home office OH is 8% and profit is 9% for the Prime Contractor. Professional labor overhead is 100%. Allowances and items with mandated costs such as per diem do not have overhead and profit applied.

Items previously developed by Anchor QEA (2010) already include contractor markups, therefore overhead and profit were not applied to those items.

It is assumed that OH is 1% and profit is 0% for vendor quotes for treatment and disposal at offsite disposal facilities. It is assumed that OH is 5% and profit is 0% for quotes for all other material vendor quotes.

**Abbreviations:**

QTY	Quantity	ACR	Acres
EQUIP	Equipment	BCY	Bank Cubic Yard
MATL	Material	CLF	100 Linear Foot
HPF	HTRW Productivity Factor	DY	Days
ADJ LABOR	Adjusted Labor for HPF	EA	Each
ADJ EQUIP	Adjusted Equipment for HPF	LF	Linear Foot
UNMOD UC	Unmodified Unit Cost	HR	Hours
UNMOD LIC	Unmodified Line Item Cost	LB	Pounds
UNBUR LIC	Unburdened Line Item Cost	LCY	Loose Cubic Yard
PC OH	Prime Contractor Overhead	LS	Lump Sum
PC PF	Prime Contractor Profit	RL	Roll
BUR LIC	Burdened Line Item Cost	SY	Square Yard
		TN	Tons

TABLE CW-F3

Alternative F		Cost Worksheet:	CW-F3		
Capital Cost Sub-Element					
Evaluating and Updating Institutional Controls					
Site:	Portland Harbor Superfund Site	Prepared By:	JN	Date:	7/27/2015
Location:	Portland, Oregon	Checked By:	AS	Date:	7/28/2015
Phase:	Draft Feasibility Study				
Base Year:	2015				

COST WORKSHEET

**Work Statement:**  
This sub-element involves evaluating and updating of institutional controls for the site. The following cost includes labor and materials to required for evaluating and updating institutional controls every 5 years.

**Cost Analysis:**  
Cost for Evaluating and Updating Institutional Controls (Lump Sum)

COST DATABASE CODE	DESCRIPTION	QTY	UNIT(S)	HPF	LABOR	ADJ LABOR	EQUIP	ADJ EQUIP	MATL	OTHER	UNMOD UC	UNMOD LIC	PC OH	PC PF	BUR LIC	COST SOURCE CITATION	COMMENTS
	Informational Devices - Fish Consumption Advisory																
L11	Project Manager	80	HR	1.00	\$82.17	\$82.17	\$0.00	\$0.00	\$0.00	\$0.00	\$82.17	\$6,573.60	100%	9%	\$14,330	FLC FLCDataCenter	Assumes 10% of initial costs for updating periodically
L4	Environmental Engineer	50	HR	1.00	\$48.91	\$48.91	\$0.00	\$0.00	\$0.00	\$0.00	\$48.91	\$2,445.50	100%	9%	\$5,331	FLC FLCDataCenter	Assumes 10% of initial costs for updating periodically
L6	Environmental Scientist	80	HR	1.00	\$37.70	\$37.70	\$0.00	\$0.00	\$0.00	\$0.00	\$37.70	\$3,016.00	100%	9%	\$6,575	FLC FLCDataCenter	Assumes 10% of initial costs for updating periodically
L3	Clerks, Typist, Bookkeeper & Receptionist	30	HR	1.00	\$19.89	\$19.89	\$0.00	\$0.00	\$0.00	\$0.00	\$19.89	\$596.70	100%	9%	\$1,301	FLC FLCDataCenter	Assumes 10% of initial costs for updating periodically
L5	Environmental Lawyer	15	HR	1.00	\$71.72	\$71.72	\$0.00	\$0.00	\$0.00	\$0.00	\$71.72	\$1,075.80	100%	9%	\$2,345	FLC FLCDataCenter	Assumes 10% of initial costs for updating periodically
L13	Paralegal	30	HR	1.00	\$29.56	\$29.56	\$0.00	\$0.00	\$0.00	\$0.00	\$29.56	\$886.80	100%	9%	\$1,933	FLC FLCDataCenter	Assumes 10% of initial costs for updating periodically
	Informational Devices - Regulated Navigation Area (RNA) Setup																
L11	Project Manager	15	HR	1.00	\$82.17	\$82.17	\$0.00	\$0.00	\$0.00	\$0.00	\$82.17	\$1,232.55	100%	9%	\$2,687	FLC FLCDataCenter	Assumes 10% of initial costs for updating periodically
L4	Environmental Engineer	10	HR	1.00	\$48.91	\$48.91	\$0.00	\$0.00	\$0.00	\$0.00	\$48.91	\$489.10	100%	9%	\$1,066	FLC FLCDataCenter	Assumes 10% of initial costs for updating periodically
L5	Environmental Lawyer	8	HR	2.00	\$71.72	\$35.86	\$0.00	\$0.00	\$0.00	\$0.00	\$35.86	\$286.88	100%	9%	\$625	FLC FLCDataCenter	Assumes 10% of initial costs for updating periodically
L13	Paralegal	16	HR	1.00	\$29.56	\$29.56	\$0.00	\$0.00	\$0.00	\$0.00	\$29.56	\$472.96	100%	9%	\$1,031	FLC FLCDataCenter	Assumes 10% of initial costs for updating periodically
A1	18' Boat	80	HR	1.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$28.02	\$28.02	\$2,241.60	8%	9%	\$2,639	MII MII Assembly	For buoy setup
L17	Boat Operator	80	HR	1.00	\$33.16	\$33.16	\$0.00	\$0.00	\$0.00	\$0.00	\$33.16	\$2,652.80	100%	9%	\$5,783	FLC FLCDataCenter	
L8	Field Technician	80	HR	1.00	\$31.42	\$31.42	\$0.00	\$0.00	\$0.00	\$0.00	\$31.42	\$2,513.60	100%	9%	\$5,480	FLC FLCDataCenter	
M21	Buoy	120	EA	1.00	\$0.00	\$0.00	\$0.00	\$0.00	\$421.76	\$0.00	\$421.76	\$50,611.20	5%	0%	\$53,142	V Vendor Quote	Quote - Go2Marine
	Proprietary Controls																
L5	Environmental Lawyer	20	HR	1.00	\$71.72	\$71.72	\$0.00	\$0.00	\$0.00	\$0.00	\$71.72	\$1,434.40	100%	9%	\$3,127	FLC FLCDataCenter	Assumes 10% of initial costs for updating periodically
L13	Paralegal	25	HR	1.00	\$29.56	\$29.56	\$0.00	\$0.00	\$0.00	\$0.00	\$29.56	\$739.00	100%	9%	\$1,611	FLC FLCDataCenter	Assumes 10% of initial costs for updating periodically
L3	Clerks, Typist, Bookkeeper & Receptionist	15	HR	1.00	\$19.89	\$19.89	\$0.00	\$0.00	\$0.00	\$0.00	\$19.89	\$298.35	100%	9%	\$650	FLC FLCDataCenter	Assumes 10% of initial costs for updating periodically
	Enforcement Tools																
L5	Environmental Lawyer	420	HR	1.00	\$71.72	\$71.72	\$0.00	\$0.00	\$0.00	\$0.00	\$71.72	\$30,122.40	100%	9%	\$65,667	FLC FLCDataCenter	Assumes 10% of initial costs for updating periodically
L13	Paralegal	525	HR	1.00	\$29.56	\$29.56	\$0.00	\$0.00	\$0.00	\$0.00	\$29.56	\$15,519.00	100%	9%	\$33,831	FLC FLCDataCenter	Assumes 10% of initial costs for updating periodically
L3	Clerks, Typist, Bookkeeper & Receptionist	210	HR	1.00	\$19.89	\$19.89	\$0.00	\$0.00	\$0.00	\$0.00	\$19.89	\$4,176.90	100%	9%	\$9,106	FLC FLCDataCenter	Assumes 10% of initial costs for updating periodically
TOTAL UNIT COST:															\$218,260		

**Notes:**

HTRW productivity factor is from Exhibit B-3 or B-4 of "A Guide to Developing and Documenting Cost Estimates During the Feasibility Study", EPA 2000

The Cost Database Code is a reference code for linking with line item cost information with the cost source database and is not otherwise used within these cost worksheets.

**Source of Cost Data:**

NA Not Applicable - costs are from previous work or vendor quote

For citation references, the following sources apply:

MII (MII Assemblies), GSA (www.gsa.gov), FLC (www.flcdatacenter.com), A (Allowance), V (Vendor Quote), CW (Means CostWorks 2015), P (Previous Work), and FRTR (www.frtr.org)

**Cost Adjustment Checklist:**

FACTOR: Field work will be in Level "D" PPE.

H&S Productivity (labor and equipment only) MII assembly costs include HPF adjustments.

Escalation to Base Year 2015 cost sources are not escalated (EF=1.00). All other costs are escalated based on the USACE WCCIS, EM 1110-2-1304, Mar 2015.

Area Cost Factor An AF of 1.05 is used for Oregon, except that an AF of 1.00 (national unmodified average) is used for MII assembly costs and local vendor quotes.

Subcontractor Overhead and Profit It is assumed that home office OH is 8% and profit is 9% for the Prime Contractor. Professional labor overhead is 100%. Allowances and items with mandated costs such as per diem do not have overhead and profit applied.

Prime Contractor Overhead and Profit Items previously developed by Anchor QEA (2010) already include contractor markups, therefore overhead and profit were not applied to those items.

It is assumed that OH is 1% and profit is 0% for vendor quotes for treatment and disposal at offsite disposal facilities. It is assumed that OH is 5% and profit is 0% for quotes for all other material vendor quotes.

**Abbreviations:**

QTY	Quantity	ACR	Acres
EQUIP	Equipment	BCY	Bank Cubic Yard
MATL	Material	CLF	100 Linear Foot
HPF	HTRW Productivity Factor	DY	Days
ADJ LABOR	Adjusted Labor for HPF	EA	Each
ADJ EQUIP	Adjusted Equipment for HPF	LF	Linear Foot
UNMOD UC	Unmodified Unit Cost	HR	Hours
UNMOD LIC	Unmodified Line Item Cost	LB	Pounds
UNBUR LIC	Unburdened Line Item Cost	LCY	Loose Cubic Yard
PC OH	Prime Contractor Overhead	LS	Lump Sum
PC PF	Prime Contractor Profit	RL	Roll
BUR LIC	Burdened Line Item Cost	SY	Square Yard
		TN	Tons

## TABLE CW-F5

Alternative F	Cost Worksheet:	CW-F5	<b>COST WORKSHEET</b>
Capital Cost Sub-Element			
Debris Removal and Disposal			

<b>Site:</b>	Portland Harbor Superfund Site	<b>Prepared By:</b>	JN	<b>Date:</b>	7/27/2015
<b>Location:</b>	Portland, Oregon				
<b>Phase:</b>	Draft Feasibility Study	<b>Checked By:</b>	AS	<b>Date:</b>	7/28/2015
<b>Base Year:</b>	2015				

**Work Statement:**  
This sub-element involves removal and disposal of debris for all areas prior to remedial activities. It includes costs for on-site labor, equipment, and materials developed from previous work.

**Cost Analysis:**  
Cost for Debris Removal and Disposal (Lump Sum)

COST DATABASE CODE	DESCRIPTION	QTY	UNIT(S)	HPF	LABOR	ADJ LABOR	EQUIP	ADJ EQUIP	MATL	OTHER	UNMOD UC	UNMOD LIC	PC OH	PC PF	BUR LIC	COST SOURCE CITATION	COMMENTS
P9	Debris Removal and Disposal	537.5	AC	1.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$13,083.75	\$13,083.75	\$7,032,365.44	0%	0%	\$7,032,365	P Previous Work	Developed by Anchor QEA (2010)
												TOTAL UNIT COST:		\$7,032,365			

<b>Notes:</b>		<b>Abbreviations:</b>	
HTRW productivity factor is from Exhibit B-3 or B-4 of "A Guide to Developing and Documenting Cost Estimates During the Feasibility Study", EPA 2000		QTY	Quantity
The Cost Database Code is a reference code for linking with line item cost information with the cost source database and is not otherwise used within these cost worksheets.		EQUIP	Equipment
		ACR	Acre
		BCY	Bank Cubic Yard

<b>Source of Cost Data:</b>	HPF	HTRW Productivity Factor	DY	Days
NA Not Applicable - costs are from previous work or vendor quote	ADJ LABOR	Adjusted Labor for HFP	EA	Each
For citation references, the following sources apply:	ADJ EQUIP	Adjusted Equipment for HFP	LF	Linear Foot
MII (MII Assemblies), GSA ( <a href="http://www.gsa.gov">www.gsa.gov</a> ), FLC ( <a href="http://www.flcdatcenter.com">www.flcdatcenter.com</a> ), A (Allowance), V (Vendor Quote), CW (Means CostWorks 2015), P (Previous Work), and FRTR ( <a href="http://www.frtr.gov">www.frtr.gov</a> )	UNMOD UC	Unmodified Unit Cost	HR	Hours

<u>Cost Adjustment Checklist:</u>		<u>NOTES:</u>		
FACTOR:		Field work will be in Level "D" PPE.	UNBUR LIC	Unburdened Line Item Cost
H&S Productivity (labor and equipment only)		MII assembly costs include HPF adjustments.	PC OH	Prime Contractor Overhead
Escalation to Base Year		2015 cost sources are not escalated (EF=1.00). All other costs are escalated based on the USACE CWCCIS, EM 1110-2-1304, Mar 2015.	PC PF	Prime Contractor Profit
Area Cost Factor		An AF of 1.05 is used for Oregon, except that an AF of 1.00 (national unmodified average) is used for MII assembly costs and local vendor quotes.	BUR LIC	Burdened Line Item Cost
Subcontractor Overhead and Profit		It is assumed that home office OH is 8% and profit is 9% for the Prime Contractor. Professional labor overhead is 100%. Allowances and items with mandated costs such as per diem do not have overhead and profit applied.	SY	Square Yard
Prime Contractor Overhead and Profit		Items previously developed by Anchor QEA (2010) already include contractor markups, therefore overhead and profit were not applied to those items.	TN	Tons
		It is assumed that OH is 1% and profit is 0% for vendor quotes for treatment and disposal at offsite disposal facilities. It is assumed that OH is 5% and profit is 0% for quotes for all other material vendor quotes.		

TABLE CW-F6

<b>Alternative F</b>		<b>Cost Worksheet: CW-F6</b>		<b>COST WORKSHEET</b>													
<b>Capital Cost Sub-Element</b>																	
<b>Obstruction Removal and Relocation</b>																	
<b>Site:</b> Portland Harbor Superfund Site		<b>Prepared By:</b> JN										<b>Date:</b> 7/27/2015					
<b>Location:</b> Portland, Oregon		<b>Checked By:</b> AS										<b>Date:</b> 7/28/2015					
<b>Phase:</b> Draft Feasibility Study																	
<b>Base Year:</b> 2015																	
<b>Work Statement:</b> This sub-element involves all work related to obstructions removal, relocation, and disposal. It includes all costs for labor, equipment and materials developed from previous work for pile removal and disposal, pile replacement, and temporary dock relocation.																	
<b>Cost Analysis:</b> Cost for Obstructions (Lump Sum)																	
COST DATABASE CODE	DESCRIPTION	QTY	UNIT(S)	HPF	LABOR	ADJ LABOR	EQUIP	ADJ EQUIP	MATL	OTHER	UNMOD UC	UNMOD LIC	PC OH	PC PF	BUR LIC	COST SOURCE CITATION	COMMENTS
P10	Pile Removal and Disposal	2,500	EA	1.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$714.38	\$714.38	\$1,785,937.50	0%	0%	\$1,785,938	P Previous Work	Developed by Anchor QEA (2010)
P11	Pile Replacement	2,500	EA	1.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$7,465.50	\$7,465.50	\$18,663,750.00	0%	0%	\$18,663,750	P Previous Work	Developed by Anchor QEA (2010)
P12	Temporary Dock Relocation	10	EA	1.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$100,319.63	\$100,319.63	\$1,003,196.25	0%	0%	\$1,003,196	P Previous Work	Developed by Anchor QEA (2010)
<b>TOTAL UNIT COST:</b>															\$21,452,884		
<b>Notes:</b> HTRW productivity factor is from Exhibit B-3 or B-4 of "A Guide to Developing and Documenting Cost Estimates During the Feasibility Study", EPA 2000 The Cost Database Code is a reference code for linking with line item cost information with the cost source database and is not otherwise used within these cost worksheets.																	
<b>Source of Cost Data:</b> NA Not Applicable - costs are from previous work or vendor quote For citation references, the following sources apply: MII (MII Assemblies), GSA (www.gsa.gov), FLC (www.flcdatcenter.com), A (Allowance), V (Vendor Quote), CW (Means CostWorks 2015), P (Previous Work), and FRTR (www.frtr.gov)																	
<b>Cost Adjustment Checklist:</b> FACTOR: Field work will be in Level "D" PPE. H&S Productivity (labor and equipment only) MII assembly costs include HPF adjustments. Escalation to Base Year 2015 cost sources are not escalated (EF=1.00). All other costs are escalated based on the USACE CWCCIS, EM 1110-2-1304, Mar 2015. Area Cost Factor An AF of 1.05 is used for Oregon, except that an AF of 1.00 (national unmodified average) is used for MII assembly costs and local vendor quotes. Subcontractor Overhead and Profit It is assumed that home office OH is 8% and profit is 9% for the Prime Contractor. Professional labor overhead is 100%. Allowances and items with mandated costs such as per diem do not have overhead and profit applied. Prime Contractor Overhead and Profit Items previously developed by Anchor QEA (2010) already include contractor markups, therefore overhead and profit were not applied to those items. It is assumed that OH is 1% and profit is 0% for vendor quotes for treatment and disposal at offsite disposal facilities. It is assumed that OH is 5% and profit is 0% for quotes for all other material vendor quotes.																	
<b>Abbreviations:</b> QTY Quantity ACR Acres EQUIP Equipment BCY Bank Cubic Yard MATL Material CLF 100 Linear Foot HPF HTRW Productivity Factor DY Days ADJ LABOR Adjusted Labor for HFP EA Each ADJ EQUIP Adjusted Equipment for HFP LF Linear Foot UNMOD UC Unmodified Unit Cost HR Hours UNMOD LIC Unmodified Line Item Cost LB Pounds UNBUR LIC Unburdened Line Item Cost LCY Loose Cubic Yard PC OH Prime Contractor Overhead LS Lump Sum PC PF Prime Contractor Profit RL Roll BUR LIC Burdened Line Item Cost SY Square Yard TN Tons																	

TABLE CW-F7

TABLE CW-F7																		
Alternative F Capital Cost Sub-Element Erosion/Residual Control Measures		Cost Worksheet: CW-F7										COST WORKSHEET						
<b>Site:</b> Portland Harbor Superfund Site												<b>Prepared By:</b> JN		<b>Date:</b> 7/27/2015				
<b>Location:</b> Portland, Oregon												<b>Checked By:</b> AS		<b>Date:</b> 7/28/2015				
<b>Phase:</b> Draft Feasibility Study																		
<b>Base Year:</b> 2015																		
<p><b>Work Statement:</b>            This sub-element involves the installation, maintenance, and removal of silt curtains and sheet pile walls for erosion and residual control. It includes costs for on-site labor, equipment, and materials developed from previous work.</p>																		
<p><b>Cost Analysis:</b>            Cost for Erosion/Residual Control Measures (Lump Sum)</p>																		
COST DATABASE CODE	DESCRIPTION	QTY	UNIT(S)	HPF	LABOR	ADJ LABOR	EQUIP	ADJ EQUIP	MATL	OTHER	UNMOD UC	UNMOD LIC	PC OH	PC PF	BUR LIC	COST SOURCE CITATION	COMMENTS	
P13	Purchase, Install and Maintain Silt Curtains	65,500	LF	1.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$96.75	\$96.75	\$6,337,125.00	0%	0%	\$6,337,125	P Previous Work	Developed by Anchor QEA (2010)	
P14	Purchase, Install and Remove Sheet Pile Walls	7,500	LF	1.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$2,745.00	\$2,745.00	\$20,587,500.00	0%	0%	\$20,587,500	P Previous Work	Developed by Anchor QEA (2010)	
TOTAL UNIT COST:																	<div style="border: 1px solid black; padding: 2px;">\$26,924,625</div>	
<div style="display: flex; justify-content: space-between;"> <div style="width: 60%;"> <p><b>Notes:</b>            HTRW productivity factor is from Exhibit B-3 or B-4 of "A Guide to Developing and Documenting Cost Estimates During the Feasibility Study", EPA 2000            The Cost Database Code is a reference code for linking with line item cost information with the cost source database and is not otherwise used within these cost worksheets.</p> <p><b>Source of Cost Data:</b>            NA Not Applicable - costs are from previous work or vendor quote            For citation references, the following sources apply:            MII (MII Assemblies), GSA (www.gsa.gov), FLC (www.flcdatcenter.com), A (Allowance), V (Vendor Quote), CW (Means CostWorks 2015), P (Previous Work), and FRTR (www.frtr.gov)</p> <p><b>Cost Adjustment Checklist:</b>            FACTOR:            H&amp;S Productivity (labor and equipment only)            Escalation to Base Year            Area Cost Factor            Subcontractor Overhead and Profit            Prime Contractor Overhead and Profit</p> </div> <div style="width: 35%;"> <p><b>Abbreviations:</b>            QTY Quantity            EQUIP Equipment            MATL Material            HPF HTRW Productivity Factor            ADJ LABOR Adjusted Labor for HFP            ADJ EQUIP Adjusted Equipment for HFP            UNMOD UC Unmodified Unit Cost            UNMOD LIC Unmodified Line Item Cost            UNBUR LIC Unburdened Line Item Cost            PC OH Prime Contractor Overhead            PC PF Prime Contractor Profit            BUR LIC Burdened Line Item Cost</p> <p>ACR Acres            BCY Bank Cubic Yard            CLF 100 Linear Foot            DY Days            EA Each            LF Linear Foot            HR Hours            LB Pounds            LCY Loose Cubic Yard            LS Lump Sum            RL Roll            SY Square Yard            TN Tons</p> </div> </div> <p><b>NOTES:</b>            Field work will be in Level "D" PPE.            MII assembly costs include HPF adjustments.            2015 cost sources are not escalated (EF=1.00). All other costs are escalated based on the USACE CWCCIS, EM 1110-2-1304, Mar 2015.            An AF of 1.05 is used for Oregon, except that an AF of 1.00 (national unmodified average) is used for MII assembly costs and local vendor quotes.            It is assumed that home office OH is 8% and profit is 9% for the Prime Contractor. Professional labor overhead is 100%. Allowances and items with mandated costs such as per diem do not have overhead and profit applied.            Items previously developed by Anchor QEA (2010) already include contractor markups, therefore overhead and profit were not applied to those items.            It is assumed that OH is 1% and profit is 0% for vendor quotes for treatment and disposal at offsite disposal facilities. It is assumed that OH is 5% and profit is 0% for quotes for all other material vendor quotes.</p>																		

TABLE CW-F8

<div style="display: flex; justify-content: space-between;"> <span>Alternative F</span> <span>Cost Worksheet: CW-F8</span> </div> <div style="display: flex; justify-content: space-between; margin-top: 5px;"> <span>Capital Cost Sub-Element</span> <span><b>COST WORKSHEET</b></span> </div>																	
<b>Dredging of Contaminated Sediments (Open Water)</b>																	
<b>Site:</b> Portland Harbor Superfund Site <b>Location:</b> Portland, Oregon <b>Phase:</b> Draft Feasibility Study <b>Base Year:</b> 2015												<b>Prepared By:</b> JN  <b>Checked By:</b> AS		<b>Date:</b> 7/27/2015  <b>Date:</b> 7/28/2015			
<b>Work Statement:</b> This sub-element involves mechanical dredging of contaminated sediments in open water areas and transport to offloading area. It includes costs for on-site labor, equipment, and materials developed from previous work.																	
<b>Cost Analysis:</b> Cost for Open Water Dredging (Lump Sum)																	
COST DATABASE CODE	DESCRIPTION	QTY	UNIT(S)	HPF	LABOR	ADJ LABOR	EQUIP	ADJ EQUIP	MATL	OTHER	UNMOD UC	UNMOD LIC	PC OH	PC PF	BUR LIC	COST SOURCE CITATION	COMMENTS
P15	Open Water Dredging and Transport	4,585,640	CY	1.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$38.03	\$38.03	\$174,368,961.00	0%	0%	\$174,368,961	P Previous Work	Developed by Anchor QEA (2010)
												<b>TOTAL UNIT COST:</b>		\$174,368,961			
<div style="display: flex; justify-content: space-between;"> <div style="width: 60%;"> <b>Notes:</b>            HTRW productivity factor is from Exhibit B-3 or B-4 of "A Guide to Developing and Documenting Cost Estimates During the Feasibility Study", EPA 2000            The Cost Database Code is a reference code for linking with line item cost information with the cost source database and is not otherwise used within these cost worksheets.   <b>Source of Cost Data:</b>            NA Not Applicable - costs are from previous work or vendor quote            For citation references, the following sources apply:            MII (MII Assemblies), GSA (www.gsa.gov), FLC (www.flcdatcenter.com), A (Allowance), V (Vendor Quote), CW (Means CostWorks 2015), P (Previous Work), and FRTR (www.frtr.gov)         </div> <div style="width: 35%;"> <b>Abbreviations:</b>            QTY Quantity            EQUIP Equipment            MATL Material            HPF HTRW Productivity Factor            ADJ LABOR Adjusted Labor for HFP            ADJ EQUIP Adjusted Equipment for HFP            UNMOD UC Unmodified Unit Cost            UNMOD LIC Unmodified Line Item Cost            UNBUR LIC Unburdened Line Item Cost            PC OH Prime Contractor Overhead            PC PF Prime Contractor Profit            BUR LIC Burdened Line Item Cost             ACR Acres            BCY Bank Cubic Yard            CLF 100 Linear Foot            DY Days            EA Each            LF Linear Foot            HR Hours            LB Pounds            LCY Loose Cubic Yard            LS Lump Sum            RL Roll            SY Square Yard            TN Tons         </div> </div>																	
<div style="display: flex; justify-content: space-between;"> <div style="width: 45%;"> <b>Cost Adjustment Checklist:</b>            FACTOR:            H&amp;S Productivity (labor and equipment only)            Escalation to Base Year            Area Cost Factor            Subcontractor Overhead and Profit            Prime Contractor Overhead and Profit         </div> <div style="width: 50%;"> <b>NOTES:</b>            Field work will be in Level "D" PPE.            MII assembly costs include HPF adjustments.            2015 cost sources are not escalated (EF=1.00). All other costs are escalated based on the USACE CWCCIS, EM 1110-2-1304, Mar 2015.            An AF of 1.05 is used for Oregon, except that an AF of 1.00 (national unmodified average) is used for MII assembly costs and local vendor quotes.            It is assumed that home office OH is 8% and profit is 9% for the Prime Contractor. Professional labor overhead is 100%. Allowances and items with mandated costs such as per diem do not have overhead and profit applied.            Items previously developed by Anchor QEA (2010) already include contractor markups, therefore overhead and profit were not applied to those items.            It is assumed that OH is 1% and profit is 0% for vendor quotes for treatment and disposal at offsite disposal facilities. It is assumed that OH is 5% and profit is 0% for quotes for all other material vendor quotes.         </div> </div>																	



## TABLE CW-F9

## Dredging of Contaminated Sediments (Confined)

[illegible]

---

HTRW productivity factor is from Exhibit B-3 or B-4 of "A Guide to Developing and Documenting Cost Estimates During the Feasibility Study", EPA 2000	QTY	Quantity	ACR	Acre
--	-----	----------	-----	------

	MATL	Material	CLF	100 Linear Foot
--	------	----------	-----	-----------------

NA	Not Applicable - costs are from previous work or vendor quote	ADJ LABOR	Adjusted Labor for HFP	EA	Each
----	---	-----------	------------------------	----	------

	UNMOD LIC	Unmodified Line Item Cost	LB	Pounds
--	-----------	---------------------------	----	--------

FACTOR:	Field work will be in Level "D" PPE.	PC OH	Prime Contractor Overhead	LS	Lump Sum
---------	--------------------------------------	-------	---------------------------	----	----------

---

TABLE CW-F10

<div style="display: flex; justify-content: space-between;"> <span>Alternative F</span> <span>Cost Worksheet: CW-F10</span> </div> <div style="display: flex; justify-content: space-between; align-items: center;"> <span>Capital Cost Sub-Element</span> <span style="font-size: 1.2em; font-weight: bold;">COST WORKSHEET</span> </div> <div style="display: flex; justify-content: space-between; align-items: center;"> <span>Excavation of Contaminated Sediments (From Shore for Riverbanks)</span> </div>																	
<b>Site:</b> Portland Harbor Superfund Site <b>Location:</b> Portland, Oregon <b>Phase:</b> Draft Feasibility Study <b>Base Year:</b> 2015												<b>Prepared By:</b> JN  <b>Checked By:</b> AS		<b>Date:</b> 7/27/2015  <b>Date:</b> 7/28/2015			
<b>Work Statement:</b> This sub-element involves mechanical excavation from the shore of contaminated materials along the riverbanks. It includes costs for on-site labor, equipment, and materials developed from previous work.																	
<b>Cost Analysis:</b> Cost for Excavation from Shore for Riverbanks (Lump Sum)																	
COST DATABASE CODE	DESCRIPTION	QTY	UNIT(S)	HPF	LABOR	ADJ LABOR	EQUIP	ADJ EQUIP	MATL	OTHER	UNMOD UC	UNMOD LIC	PC OH	PC PF	BUR LIC	COST SOURCE CITATION	COMMENTS
P17	Dredging from Shore	108,059	CY	1.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$46.80	\$46.80	\$5,057,161.20	0%	0%	\$5,057,161	P Previous Work	Developed by Anchor QEA (2010)
												<b>TOTAL UNIT COST:</b>		\$5,057,161			
<div style="display: flex; justify-content: space-between;"> <div style="width: 60%;"> <b>Notes:</b>            HTRW productivity factor is from Exhibit B-3 or B-4 of "A Guide to Developing and Documenting Cost Estimates During the Feasibility Study", EPA 2000            The Cost Database Code is a reference code for linking with line item cost information with the cost source database and is not otherwise used within these cost worksheets.   <b>Source of Cost Data:</b>            NA Not Applicable - costs are from previous work or vendor quote            For citation references, the following sources apply:            MII (MII Assemblies), GSA (<a href="http://www.gsa.gov">www.gsa.gov</a>), FLC (<a href="http://www.flcdatabase.com">www.flcdatabase.com</a>), A (Allowance), V (Vendor Quote), CW (Means CostWorks 2015), P (Previous Work), and FRTR (<a href="http://www.ftr.gov">www.ftr.gov</a>)         </div> <div style="width: 35%;"> <b>Abbreviations:</b>            QTY Quantity            EQUIP Equipment            MATL Material            HPF HTRW Productivity Factor            ADJ LABOR Adjusted Labor for HFP            ADJ EQUIP Adjusted Equipment for HFP            UNMOD UC Unmodified Unit Cost            UNMOD LIC Unmodified Line Item Cost            UNBUR LIC Unburdened Line Item Cost            PC OH Prime Contractor Overhead            PC PF Prime Contractor Profit            BUR LIC Burdened Line Item Cost             ACR Acres            BCY Bank Cubic Yard            CLF 100 Linear Foot            DY Days            EA Each            LF Linear Foot            HR Hours            LB Pounds            LCY Loose Cubic Yard            LS Lump Sum            RL Roll            SY Square Yard            TN Tons         </div> </div> <div style="display: flex; justify-content: space-between; margin-top: 10px;"> <div style="width: 60%;"> <b>Cost Adjustment Checklist:</b>            FACTOR:            H&amp;S Productivity (labor and equipment only)            Escalation to Base Year            Area Cost Factor            Subcontractor Overhead and Profit            Prime Contractor Overhead and Profit         </div> <div style="width: 35%;"> <b>NOTES:</b>            Field work will be in Level "D" PPE.            MII assembly costs include HPF adjustments.            2015 cost sources are not escalated (EF=1.00). All other costs are escalated based on the USACE CWCCIS, EM 1110-2-1304, Mar 2015.            An AF of 1.05 is used for Oregon, except that an AF of 1.00 (national unmodified average) is used for MII assembly costs and local vendor quotes.            It is assumed that home office OH is 8% and profit is 9% for the Prime Contractor. Professional labor overhead is 100%. Allowances and items with mandated costs such as per diem do not have overhead and profit applied.            Items previously developed by Anchor QEA (2010) already include contractor markups, therefore overhead and profit were not applied to those items.            It is assumed that OH is 1% and profit is 0% for vendor quotes for treatment and disposal at offsite disposal facilities. It is assumed that OH is 5% and profit is 0% for quotes for all other material vendor quotes.         </div> </div>																	

TABLE CW-F11

<b>TABLE CW-F11</b>																	
<div style="display: flex; justify-content: space-between;"> <div> <b>Alternative F</b>  <b>Capital Cost Sub-Element</b>  <b>Hydraulic Offloading of the Contaminated Sediments</b> </div> <div> <b>Cost Worksheet: CW-F11</b> </div> <div style="text-align: right;"> <b>COST WORKSHEET</b> </div> </div>																	
<b>Site:</b> Portland Harbor Superfund Site <b>Location:</b> Portland, Oregon <b>Phase:</b> Draft Feasibility Study <b>Base Year:</b> 2015												<b>Prepared By:</b> AB  <b>Checked By:</b> JN			<b>Date:</b> 8/11/2015  <b>Date:</b> 8/12/2015		
<b>Work Statement:</b> This sub-element involves the hydraulic offloading of contaminated sediments. The contaminated sediments would be offloaded at the transload facility (for Subtitle C/TSCA or Subtitle D disposal). It includes costs for on-site labor, equipment, and materials developed from previous work.																	
<b>Cost Analysis:</b> Cost for Hydraulic Offloading (Lump Sum)																	
COST DATABASE CODE	DESCRIPTION	QTY	UNIT(S)	HPF	LABOR	ADJ LABOR	EQUIP	ADJ EQUIP	MATL	OTHER	UNMOD UC	UNMOD LIC	PC OH	PC PF	BUR LIC	COST SOURCE CITATION	COMMENTS
	Hydraulic Offloading for Subtitle C Disposal																
P19	Hydraulic Offloading	443,819	CY	1.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$6.30	\$6.30	\$2,796,059.70	0%	0%	\$2,796,060	P Previous Work	Developed by Anchor QEA (2010)
	Hydraulic Offloading for Subtitle D Disposal																
P19	Hydraulic Offloading	4,777,200	CY	1.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$6.30	\$6.30	\$30,096,360.00	0%	0%	\$30,096,360	P Previous Work	Developed by Anchor QEA (2010)
												<b>TOTAL UNIT COST:</b>					
<div style="display: flex; justify-content: space-between;"> <div> <b>Notes:</b>            HTRW productivity factor is from Exhibit B-3 or B-4 of "A Guide to Developing and Documenting Cost Estimates During the Feasibility Study", EPA 2000            The Cost Database Code is a reference code for linking with line item cost information with the cost source database and is not otherwise used within these cost worksheets.         </div> <div> <b>Abbreviations:</b>            QTY Quantity            EQUIP Equipment            MATL Material            HPF HTRW Productivity Factor            ADJ LABOR Adjusted Labor for HFP            ADJ EQUIP Adjusted Equipment for HFP            UNMOD UC Unmodified Unit Cost            UNMOD LIC Unmodified Line Item Cost            UNBUR LIC Unburdened Line Item Cost            PC OH Prime Contractor Overhead            PC PF Prime Contractor Profit            BUR LIC Burdened Line Item Cost         </div> <div>           ACR Acres            BCY Bank Cubic Yard            CLF 100 Linear Foot            DY Days            EA Each            LF Linear Foot            HR Hours            LB Pounds            LCY Loose Cubic Yard            LS Lump Sum            RL Roll            SY Square Yard            TN Tons         </div> </div>																	
<b>Source of Cost Data:</b> NA Not Applicable - costs are from previous work or vendor quote For citation references, the following sources apply: MII (MII Assemblies), GSA (www.gsa.gov), FLC (www.flcdatabase.com), A (Allowance), V (Vendor Quote), CW (Means CostWorks 2015), P (Previous Work), and FRTR (www.frtr.gov)																	
<b>Cost Adjustment Checklist:</b> FACTOR: Field work will be in Level "D" PPE. H&S Productivity (labor and equipment only) MII assembly costs include HPF adjustments. Escalation to Base Year 2015 cost sources are not escalated (EF=1.00). All other costs are escalated based on the USACE CWCCIS, EM 1110-2-1304, Mar 2015. Area Cost Factor An AF of 1.05 is used for Oregon, except that an AF of 1.00 (national unmodified average) is used for MII assembly costs and local vendor quotes. Subcontractor Overhead and Profit It is assumed that home office OH is 8% and profit is 9% for the Prime Contractor. Professional labor overhead is 100%. Allowances and items with mandated costs such as per diem do not have overhead and profit applied. Prime Contractor Overhead and Profit Items previously developed by Anchor QEA (2010) already include contractor markups, therefore overhead and profit were not applied to those items. It is assumed that OH is 1% and profit is 0% for vendor quotes for treatment and disposal at offsite disposal facilities. It is assumed that OH is 5% and profit is 0% for quotes for all other material vendor quotes.																	

## TABLE CW-F12

Subtitle C/TSCA Disposal (Handling, Transportation, Treatment of Select PTW Materials, and Disposal)

**Cost Analysis:**

[illegible]

---

QTY	Quantity	ACR	Acres
EQUIP	Equipment	BCY	Bank Cubic Yard

NA	Not Applicable - costs are from previous work or vendor quote	ADJ LABOR	Adjusted Labor for HFP	EA	Each
----	---	-----------	------------------------	----	------

Mill (Mill Assemblies), GSA ( <a href="http://www.gsa.gov">www.gsa.gov</a> ), FLC ( <a href="http://www.flcdatadcenter.com">www.flcdatadcenter.com</a> ), A (Allowance), v (Vendor Quote), CW (Means Costworks 2015), P (Previous Work), and FRIR ( <a href="http://www.frir.gov">www.frir.gov</a> )	UNMOD UC	Unmodified Unit Cost	HR	Hours
	UNMOD LIC	Unmodified Line Item Cost	LB	Pounds

FACTOR:	Field work will be in Level "D" PPE.	PC OH	Prime Contractor Overhead	LS	Lump Sum
---------	--------------------------------------	-------	---------------------------	----	----------

2015 cost studies are not escalated. (EP=1.00). All other costs are escalated based on the USACE CWCOS, EMI 1110-2-1304, Mar. 2015.

Area Cost Factor An AF of 1.05 is used for Oregon, except that an AF of 1.00 (national unmodified average) is used for MII assembly costs and local vendor quotes.

Prime Contractor Overhead and Profit Items previously developed by Anchor QEA (2010) already include contractor markups, therefore overhead and profit were not applied to those items.

---

Page 11 CW-F12

TABLE CW-F13

TABLE CW-F13																		
Alternative F      Cost Worksheet:    CW-F13										COST WORKSHEET								
Capital Cost Sub-Element Subtitle D Disposal (Handling, Transportation, and Disposal)																		
<b>Site:</b> Portland Harbor Superfund Site <b>Location:</b> Portland, Oregon <b>Phase:</b> Draft Feasibility Study <b>Base Year:</b> 2015										<b>Prepared By:</b> AB  <b>Checked By:</b> JN				<b>Date:</b> 8/11/2015  <b>Date:</b> 8/12/2015				
<b>Work Statement:</b> This sub-element involves the disposal of contaminated sediments at a Subtitle D landfill, including materials handling from the barge to truck, transportation of the sediments to the Subtitle D landfill, and disposal of contaminated sediments. It includes costs for on-site labor, equipment, and materials developed from previous work, as well as recent vendor quotes.																		
<b>Cost Analysis:</b> Cost for Subtitle D Disposal (Lump Sum)																		
COST DATABASE CODE	DESCRIPTION	QTY	UNIT(S)	HPF	LABOR	ADJ LABOR	EQUIP	ADJ EQUIP	MATL	OTHER	UNMOD UC	UNMOD LIC	PC OH	PC PF	BUR LIC	COST SOURCE CITATION	COMMENTS	
	Materials Handling																	
P20	Materials Handling from Barge to Upland Stockpile	4,777,200	CY	1.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$10.46	\$10.46	\$49,981,455.00	0%	0%	\$49,981,455	P Previous Work	Developed by Anchor QEA (2010)	
P21	Mix DE with Dredged Material to Improve Handling	370,233	TON	1.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$2.25	\$2.25	\$833,024.25	0%	0%	\$833,024	P Previous Work	Developed by Anchor QEA (2010)	
M7	Diatomaceous Earth	370,233	TON	1.00	\$0.00	\$0.00	\$0.00	\$0.00	\$105.75	\$0.00	\$105.75	\$39,152,139.75	0%	0%	\$39,152,140	P Previous Work	Vendor Quote - Waste Management, 2010. Assumes 5% mixing rate.	
P22	Materials Handling from Stockpile to Truck/Rail Car	4,777,200	CY	1.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$8.72	\$8.72	\$41,651,212.50	0%	0%	\$41,651,213	P Previous Work	Developed by Anchor QEA (2010)	
P37	Gondola/Rail Car Mobilization	6,000	EA	1.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$4,500.00	\$4,500.00	\$27,000,000.00	0%	0%	\$27,000,000	P Previous Work	Developed by Anchor QEA (2010)	
	Transportation and Disposal at Subtitle D Landfill																	
M11	Transportation and Disposal at Subtitle D Landfill	4,777,200	CY	1.00	\$0.00	\$0.00	\$0.00	\$0.00	\$90.68	\$0.00	\$90.68	\$433,196,496.00	1%	0%	\$437,528,461	P Previous Work	Quote - Republic Services (Roosevelt Landfill). Assumes rail transportation to disposal facility.	
TOTAL UNIT COST:																	\$596,146,293	
<b>Notes:</b> HTRW productivity factor is from Exhibit B-3 or B-4 of "A Guide to Developing and Documenting Cost Estimates During the Feasibility Study", EPA 2000 The Cost Database Code is a reference code for linking with line item cost information with the cost source database and is not otherwise used within these cost worksheets.																		
<b>Source of Cost Data:</b> NA Not Applicable - costs are from previous work or vendor quote For citation references, the following sources apply: MII (MII Assemblies), GSA (www.gsa.gov), FLC (www.flcdatcenter.com), A (Allowance), V (Vendor Quote), CW (Means CostWorks 2015), P (Previous Work), and FRTR (www.frtr.gov)																		
<b>Cost Adjustment Checklist:</b> FACTOR: H&S Productivity (labor and equipment only) Escalation to Base Year Area Cost Factor Subcontractor Overhead and Profit Prime Contractor Overhead and Profit																		
<b>NOTES:</b> Field work will be in Level "D" PPE. MII assembly costs include HPF adjustments. 2015 cost sources are not escalated (EF=1.00). All other costs are escalated based on the USACE CWCCIS, EM 1110-2-1304, Mar 2015. An AF of 1.05 is used for Oregon, except that an AF of 1.00 (national unmodified average) is used for MII assembly costs and local vendor quotes. It is assumed that home office OH is 8% and profit is 9% for the Prime Contractor. Professional labor overhead is 100%. Allowances and items with mandated costs such as per diem do not have overhead and profit applied. Items previously developed by Anchor QEA (2010) already include contractor markups, therefore overhead and profit were not applied to those items. It is assumed that OH is 1% and profit is 0% for vendor quotes for treatment and disposal at offsite disposal facilities. It is assumed that OH is 5% and profit is 0% for quotes for all other material vendor quotes.																		
<b>Abbreviations:</b> QTY Quantity EQUIP Equipment MATL Material HPF HTRW Productivity Factor ADJ LABOR Adjusted Labor for HPF ADJ EQUIP Adjusted Equipment for HPF UNMOD UC Unmodified Unit Cost UNMOD LIC Unmodified Line Item Cost UNBUR LIC Unburdened Line Item Cost PC OH Prime Contractor Overhead PC PF Prime Contractor Profit BUR LIC Burdened Line Item Cost ACR Acres BCY Bank Cubic Yard CLF 100 Linear Foot DY Days EA Each LF Linear Foot HR Hours LB Pounds LCY Loose Cubic Yard LS Lump Sum RL Roll SY Square Yard TN Tons																		

TABLE CW-F14

**Alternative F**  
**Capital Cost Sub-Element**  
**Mitigation**

**Cost Worksheet: CW-F14**

**COST WORKSHEET**

<b>Site:</b>	Portland Harbor Superfund Site	<b>Prepared By:</b>	JN	<b>Date:</b>	7/27/2015
<b>Location:</b>	Portland, Oregon				
<b>Phase:</b>	Draft Feasibility Study	<b>Checked By:</b>	AS	<b>Date:</b>	7/28/2015
<b>Base Year:</b>	2015				

**Work Statement:**

This sub-element involves mitigation of shallow water and riverbank areas. It includes costs for on-site labor, equipment, and materials developed from previous work.

**Cost Analysis:**

Cost for Mitigation (Lump Sum)

COST DATABASE CODE	DESCRIPTION	QTY	UNIT(S)	HPF	LABOR	ADJ LABOR	EQUIP	ADJ EQUIP	MATL	OTHER	UNMOD UC	UNMOD LIC	PC OH	PC PF	BUR LIC	COST SOURCE CITATION	COMMENTS
P50	Mitigation	98.0	AC	1.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$2,347,130.25	\$2,347,130.25	\$230,018,764.50	0%	0%	\$230,018,765	P Previous Work	Average cost of two Lower Duwamish projects presented and referenced in Table 6.1-1 by Anchor QEA (2010).
												<b>TOTAL UNIT COST:</b>			\$230,018,765		

**Notes:**

HTRW productivity factor is from Exhibit B-3 or B-4 of "A Guide to Developing and Documenting Cost Estimates During the Feasibility Study", EPA 2000

The Cost Database Code is a reference code for linking with line item cost information with the cost source database and is not otherwise used within these cost worksheets.

**Source of Cost Data:**

NA Not Applicable - costs are from previous work or vendor quote

For citation references, the following sources apply:

MII (MII Assemblies), GSA (www.gsa.gov), FLC (www.flcdatcenter.com), A (Allowance), V (Vendor Quote), CW (Means CostWorks 2015), P (Previous Work), and FRTR (www.frtr.gov)

**Cost Adjustment Checklist:**

FACTOR:  
H&S Productivity (labor and equipment only)  
Escalation to Base Year  
Area Cost Factor  
Subcontractor Overhead and Profit  
Prime Contractor Overhead and Profit

**NOTES:**

Field work will be in Level "D" PPE.

MII assembly costs include HPF adjustments.

2015 cost sources are not escalated (EF=1.00). All other costs are escalated based on the USACE CWCCIS, EM 1110-2-1304, Mar 2015.

An AF of 1.05 is used for Oregon, except that an AF of 1.00 (national unmodified average) is used for MII assembly costs and local vendor quotes.

It is assumed that home office OH is 8% and profit is 9% for the Prime Contractor. Professional labor overhead is 100%. Allowances and items with mandated costs such as per diem do not have overhead and profit applied.

Items previously developed by Anchor QEA (2010) already include contractor markups, therefore overhead and profit were not applied to those items.

It is assumed that OH is 1% and profit is 0% for vendor quotes for treatment and disposal at offsite disposal facilities. It is assumed that OH is 5% and profit is 0% for quotes for all other material vendor quotes.

**Abbreviations:**

QTY	Quantity	ACR	Acres
EQUIP	Equipment	BCY	Bank Cubic Yard
MATL	Material	CLF	100 Linear Foot
HPF	HTRW Productivity Factor	DY	Days
ADJ LABOR	Adjusted Labor for HFP	EA	Each
ADJ EQUIP	Adjusted Equipment for HFP	LF	Linear Foot
UNMOD UC	Unmodified Unit Cost	HR	Hours
UNMOD LIC	Unmodified Line Item Cost	LB	Pounds
UNBUR LIC	Unburdened Line Item Cost	LCY	Loose Cubic Yard
PC OH	Prime Contractor Overhead	LS	Lump Sum
PC PF	Prime Contractor Profit	RL	Roll
BUR LIC	Burdened Line Item Cost	SY	Square Yard
		TN	Tons

TABLE CW-F15

<div style="display: flex; justify-content: space-between;"> <div> <b>Alternative F</b>  <b>Capital Cost Sub-Element</b>  <b>Sand Placement for Technology Assignments</b> </div> <div> <b>Cost Worksheet: CW-F15</b> </div> <div style="text-align: right;"> <b>COST WORKSHEET</b> </div> </div>																	
<b>Site:</b> Portland Harbor Superfund Site <b>Location:</b> Portland, Oregon <b>Phase:</b> Draft Feasibility Study <b>Base Year:</b> 2015												<b>Prepared By:</b> JN <b>Checked By:</b> AS <b>Date:</b> 7/27/2015 <b>Date:</b> 7/28/2015					
<b>Work Statement:</b> This sub-element involves the placement of sand for the construction of capping areas. It includes placement of sand within confined areas as well as open water areas. It includes costs for on-site labor, equipment, and materials developed from previous work.																	
<b>Cost Analysis:</b> Cost for Sand Placement for Technology Assignments (Lump Sum)																	
COST DATABASE CODE	DESCRIPTION	QTY	UNIT(S)	HPF	LABOR	ADJ LABOR	EQUIP	ADJ EQUIP	MATL	OTHER	UNMOD UC	UNMOD LIC	PC OH	PC PF	BUR LIC	COST SOURCE CITATION	COMMENTS
	Sand Placement (Riverbanks)																
P2	Sand Placement (Confined)	59,387	LCY	1.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$49.01	\$49.01	\$2,910,259.94	0%	0%	\$2,910,260	P Previous Work	Developed by Anchor QEA (2010)
M1	Sand	59,387	LCY	1.00	\$0.00	\$0.00	\$0.00	\$0.00	\$19.71	\$0.00	\$19.71	\$1,170,517.77	0%	0%	\$1,170,518	P Previous Work	Knife River Quote #7838 (2010)
	Sand Placement (Confined)																
P2	Sand Placement (Confined)	130,393	LCY	1.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$49.01	\$49.01	\$6,389,908.97	0%	0%	\$6,389,909	P Previous Work	Developed by Anchor QEA (2010)
M1	Sand	130,393	LCY	1.00	\$0.00	\$0.00	\$0.00	\$0.00	\$19.71	\$0.00	\$19.71	\$2,570,046.03	0%	0%	\$2,570,046	P Previous Work	Knife River Quote #7838 (2010)
	Sand Placement (Open Water)																
P6	Sand Placement (Open Water)	1,210,019	LCY	1.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$23.76	\$23.76	\$28,750,051.44	0%	0%	\$28,750,051	P Previous Work	Developed by Anchor QEA (2010)
M1	Sand	1,210,019	LCY	1.00	\$0.00	\$0.00	\$0.00	\$0.00	\$19.71	\$0.00	\$19.71	\$23,849,474.49	0%	0%	\$23,849,474	P Previous Work	Knife River Quote #7838 (2010)
<b>TOTAL UNIT COST:</b>																	
<b>Notes:</b> HTRW productivity factor is from Exhibit B-3 or B-4 of "A Guide to Developing and Documenting Cost Estimates During the Feasibility Study", EPA 2000 The Cost Database Code is a reference code for linking with line item cost information with the cost source database and is not otherwise used within these cost worksheets.																	
<b>Source of Cost Data:</b> NA Not Applicable - costs are from previous work or vendor quote For citation references, the following sources apply: MII (Mill Assemblies), GSA (www.gsa.gov), FLC (www.flcdatcenter.com), A (Allowance), V (Vendor Quote), CW (Means CostWorks 2015), P (Previous Work), and FRTR (www.frtr.gov)																	
<div style="display: flex;"> <div style="flex: 1;"> <b>Cost Adjustment Checklist:</b>            FACTOR:            H&amp;S Productivity (labor and equipment only)            Escalation to Base Year            Area Cost Factor            Subcontractor Overhead and Profit            Prime Contractor Overhead and Profit         </div> <div style="flex: 1;"> <b>NOTES:</b>            Field work will be in Level "D" PPE.            MII assembly costs include HPF adjustments.            2015 cost sources are not escalated (EF=1.00). All other costs are escalated based on the USACE CWCCIS, EM 1110-2-1304, Mar 2015.            An AF of 1.05 is used for Oregon, except that an AF of 1.00 (national unmodified average) is used for MII assembly costs and local vendor quotes.            It is assumed that home office OH is 8% and profit is 9% for the Prime Contractor. Professional labor overhead is 100%. Allowances and items with mandated costs such as per diem do not have overhead and profit applied.            Items previously developed by Anchor QEA (2010) already include contractor markups, therefore overhead and profit were not applied to those items.            It is assumed that OH is 1% and profit is 0% for vendor quotes for treatment and disposal at offsite disposal facilities. It is assumed that OH is 5% and profit is 0% for quotes for all other material vendor quotes.         </div> </div>																	
<b>Abbreviations:</b> <div style="display: flex; justify-content: space-between;"> <div>           QTY Quantity            EQUIP Equipment            MATL Material            HPF HTRW Productivity Factor            ADJ LABOR Adjusted Labor for HFP            ADJ EQUIP Adjusted Equipment for HFP            UNMOD UC Unmodified Unit Cost            UNMOD LIC Unmodified Line Item Cost            UNBUR LIC Unburdened Line Item Cost            PC OH Prime Contractor Overhead            PC PF Prime Contractor Profit            BUR LIC Burdened Line Item Cost         </div> <div>           ACR Acres            BCY Bank Cubic Yard            CLF 100 Linear Foot            DY Days            EA Each            LF Linear Foot            HR Hours            LB Pounds            LCY Loose Cubic Yard            LS Lump Sum            RL Roll            SY Square Yard            TN Tons         </div> </div>																	

TABLE CW-F16

Alternative F		Cost Worksheet:	CW-F16
Capital Cost Sub-Element			
Beach Mix Placement for Technology Assignments			
COST WORKSHEET			
Site:	Portland Harbor Superfund Site	Prepared By:	JN
Location:	Portland, Oregon	Date:	7/27/2015
Phase:	Draft Feasibility Study	Checked By:	AS
Base Year:	2015	Date:	7/28/2015

**Work Statement:**  
This sub-element involves the placement of beach mix for the construction of capping areas. It includes placement of beach mix within confined areas as well as open water areas. It includes costs for on-site labor, equipment, and materials developed from previous work.

**Cost Analysis:**  
Cost for Beach Mix Placement for Technology Assignments (Lump Sum)

COST DATABASE CODE	DESCRIPTION	QTY	UNIT(S)	HPF	LABOR	ADJ LABOR	EQUIP	ADJ EQUIP	MATL	OTHER	UNMOD UC	UNMOD LIC	PC OH	PC PF	BUR LIC	COST SOURCE CITATION	COMMENTS
	Beach Mix Placement (Riverbanks)																
P5	Beach Mix Placement (Confined)	9,761	LCY	1.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$58.50	\$58.50	\$571,018.50	0%	0%	\$571,019	P Previous Work	Developed by Anchor QEA (2010)
M5	ODOT 100 Beach Mix	9,761	LCY	1.00	\$0.00	\$0.00	\$0.00	\$0.00	\$57.59	\$0.00	\$57.59	\$562,135.99	0%	0%	\$562,136	P Previous Work	Knife River Quote #7838 (2010)
	Beach Mix Placement (Confined)																
P5	Beach Mix Placement (Confined)	3,452	LCY	1.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$58.50	\$58.50	\$201,942.00	0%	0%	\$201,942	P Previous Work	Developed by Anchor QEA (2010)
M5	ODOT 100 Beach Mix	3,452	LCY	1.00	\$0.00	\$0.00	\$0.00	\$0.00	\$57.59	\$0.00	\$57.59	\$198,800.68	0%	0%	\$198,801	P Previous Work	Knife River Quote #7838 (2010)
	Beach Mix Placement (Open Water)																
P39	Beach Mix Placement (Open Water)	36,900	LCY	1.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$28.34	\$28.34	\$1,045,699.88	0%	0%	\$1,045,700	P Previous Work	Developed by Anchor QEA (2010)
M5	ODOT 100 Beach Mix	36,900	LCY	1.00	\$0.00	\$0.00	\$0.00	\$0.00	\$57.59	\$0.00	\$57.59	\$2,125,071.00	0%	0%	\$2,125,071	P Previous Work	Knife River Quote #7838 (2010)
TOTAL UNIT COST:															\$4,704,669		

**Notes:**  
HTRW productivity factor is from Exhibit B-3 or B-4 of "A Guide to Developing and Documenting Cost Estimates During the Feasibility Study", EPA 2000  
The Cost Database Code is a reference code for linking with line item cost information with the cost source database and is not otherwise used within these cost worksheets.

**Source of Cost Data:**  
NA Not Applicable - costs are from previous work or vendor quote  
For citation references, the following sources apply:  
MII (MII Assemblies), GSA (www.gsa.gov), FLC (www.flcdatcenter.com), A (Allowance), V (Vendor Quote), CW (Means CostWorks 2015), P (Previous Work), and FRTR (www.frtr.gov)

**Cost Adjustment Checklist:**  
FACTOR:  
H&S Productivity (labor and equipment only)  
Escalation to Base Year  
Area Cost Factor  
Subcontractor Overhead and Profit  
Prime Contractor Overhead and Profit

**NOTES:**  
Field work will be in Level "D" PPE.  
MII assembly costs include HPF adjustments.  
2015 cost sources are not escalated (EF=1.00). All other costs are escalated based on the USACE CWCCIS, EM 1110-2-1304, Mar 2015.  
An AF of 1.05 is used for Oregon, except that an AF of 1.00 (national unmodified average) is used for MII assembly costs and local vendor quotes.  
It is assumed that home office OH is 8% and profit is 9% for the Prime Contractor. Professional labor overhead is 100%. Allowances and items with mandated costs such as per diem do not have overhead and profit applied.  
Items previously developed by Anchor QEA (2010) already include contractor markups, therefore overhead and profit were not applied to those items.  
It is assumed that OH is 1% and profit is 0% for vendor quotes for treatment and disposal at offsite disposal facilities. It is assumed that OH is 5% and profit is 0% for quotes for all other material vendor quotes.

**Abbreviations:**  
QTY Quantity  
EQUIP Equipment  
MATL Material  
HPF HTRW Productivity Factor  
ADJ LABOR Adjusted Labor for HFP  
ADJ EQUIP Adjusted Equipment for HFP  
UNMOD UC Unmodified Unit Cost  
UNMOD LIC Unmodified Line Item Cost  
UNBUR LIC Unburdened Line Item Cost  
PC OH Prime Contractor Overhead  
PC PF Prime Contractor Profit  
BUR LIC Burdened Line Item Cost  
ACR Acres  
BCY Bank Cubic Yard  
CLF 100 Linear Foot  
DY Days  
EA Each  
LF Linear Foot  
HR Hours  
LB Pounds  
LCY Loose Cubic Yard  
LS Lump Sum  
RL Roll  
SY Square Yard  
TN Tons



TABLE CW-F17

<div style="display: flex; justify-content: space-between;"> <div> <b>Alternative F</b>  <b>Capital Cost Sub-Element</b>  <b>Armor Placement for Technology Assignments</b> </div> <div> <b>Cost Worksheet: CW-F17</b> </div> <div style="text-align: right;"> <b>COST WORKSHEET</b> </div> </div>																	
<b>Site:</b> Portland Harbor Superfund Site <b>Location:</b> Portland, Oregon <b>Phase:</b> Draft Feasibility Study <b>Base Year:</b> 2015												<b>Prepared By:</b> JN  <b>Checked By:</b> AS		<b>Date:</b> 7/27/2015  <b>Date:</b> 7/28/2015			
<b>Work Statement:</b> This sub-element involves the placement of armor for the construction of capping areas. It includes placement of armor with confined areas as well as open water areas. It includes costs for on-site labor, equipment, and materials developed from previous work.																	
<b>Cost Analysis:</b> Cost for Armor Placement for Technology Assignments (Lump Sum)																	
COST DATABASE CODE	DESCRIPTION	QTY	UNIT(S)	HPF	LABOR	ADJ LABOR	EQUIP	ADJ EQUIP	MATL	OTHER	UNMOD UC	UNMOD LIC	PC OH	PC PF	BUR LIC	COST SOURCE CITATION	COMMENTS
	Armor Placement (Riverbanks)																
P3	ODOT 200 Placement (Confined)	10,971	LCY	1.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$58.50	\$58.50	\$641,803.50	0%	0%	\$641,804	P Previous Work	Developed by Anchor QEA (2010)
M2	ODOT 200 Armor	10,971	LCY	1.00	\$0.00	\$0.00	\$0.00	\$0.00	\$57.59	\$0.00	\$57.59	\$631,819.89	0%	0%	\$631,820	P Previous Work	Knife River Quote #7838 (2010)
	Armor Placement (Confined)																
P3	ODOT 200 Placement (Confined)	36,033	LCY	1.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$58.50	\$58.50	\$2,107,930.50	0%	0%	\$2,107,931	P Previous Work	Developed by Anchor QEA (2010)
M2	ODOT 200 Armor	36,033	LCY	1.00	\$0.00	\$0.00	\$0.00	\$0.00	\$57.59	\$0.00	\$57.59	\$2,075,140.47	0%	0%	\$2,075,140	P Previous Work	Knife River Quote #7838 (2010)
	Armor Placement (Open Water)																
P7	ODOT 200 Placement (Open Water)	111,063	LCY	1.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$28.34	\$28.34	\$3,147,386.59	0%	0%	\$3,147,387	P Previous Work	Developed by Anchor QEA (2010)
M2	ODOT 200 Armor	111,063	LCY	1.00	\$0.00	\$0.00	\$0.00	\$0.00	\$57.59	\$0.00	\$57.59	\$6,396,118.17	0%	0%	\$6,396,118	P Previous Work	Knife River Quote #7838 (2010)
												<b>TOTAL UNIT COST:</b>		<b>\$15,000,200</b>			
<b>Notes:</b> HTRW productivity factor is from Exhibit B-3 or B-4 of "A Guide to Developing and Documenting Cost Estimates During the Feasibility Study", EPA 2000 The Cost Database Code is a reference code for linking with line item cost information with the cost source database and is not otherwise used within these cost worksheets.																	
<b>Source of Cost Data:</b> NA Not Applicable - costs are from previous work or vendor quote For citation references, the following sources apply: MII (Mill Assemblies), GSA (www.gsa.gov), FLC (www.flcdatabase.com), A (Allowance), V (Vendor Quote), CW (Means CostWorks 2015), P (Previous Work), and FRTR (www.frtr.gov)																	
<div style="display: flex;"> <div style="flex: 1;"> <b>Cost Adjustment Checklist:</b>            FACTOR:            H&amp;S Productivity (labor and equipment only)            Escalation to Base Year            Area Cost Factor            Subcontractor Overhead and Profit            Prime Contractor Overhead and Profit         </div> <div style="flex: 1;"> <b>NOTES:</b>            Field work will be in Level "D" PPE.            MII assembly costs include HPF adjustments.            2015 cost sources are not escalated (EF=1.00). All other costs are escalated based on the USACE CWCCIS, EM 1110-2-1304, Mar 2015.            An AF of 1.05 is used for Oregon, except that an AF of 1.00 (national unmodified average) is used for MII assembly costs and local vendor quotes.            It is assumed that home office OH is 8% and profit is 9% for the Prime Contractor. Professional labor overhead is 100%. Allowances and items with mandated costs such as per diem do not have overhead and profit applied.            Items previously developed by Anchor QEA (2010) already include contractor markups, therefore overhead and profit were not applied to those items.            It is assumed that OH is 1% and profit is 0% for vendor quotes for treatment and disposal at offsite disposal facilities. It is assumed that OH is 5% and profit is 0% for quotes for all other material vendor quotes.         </div> <div style="flex: 1;"> <b>Abbreviations:</b>            QTY Quantity            EQUIP Equipment            MATL Material            HPF HTRW Productivity Factor            ADJ LABOR Adjusted Labor for HFP            ADJ EQUIP Adjusted Equipment for HFP            UNMOD UC Unmodified Unit Cost            UNMOD LIC Unmodified Line Item Cost            UNBUR LIC Unburdened Line Item Cost            PC OH Prime Contractor Overhead            PC PF Prime Contractor Profit            BUR LIC Burdened Line Item Cost         </div> <div style="flex: 1;">           ACR Acres            BCY Bank Cubic Yard            CLF 100 Linear Foot            DY Days            EA Each            LF Linear Foot            HR Hours            LB Pounds            LCY Loose Cubic Yard            LS Lump Sum            RL Roll            SY Square Yard            TN Tons         </div> </div>																	

TABLE CW-F18

## Alternative F

Cost Worksheet: CW-F18

## Capital Cost Sub-Element

## Reactive/GAC Placement for Technology Assignments

## COST WORKSHEET

Site: Portland Harbor Superfund Site

Prepared By: JN

Date: 7/27/2015

Location: Portland, Oregon

Phase: Draft Feasibility Study

Checked By: AS

Date: 7/28/2015

Base Year: 2015

## Work Statement:

This sub-element involves the placement of the reactive layers for the construction of capping areas. It includes placement of armor within confined areas as well as open water areas. It includes costs for on-site labor, equipment, and materials developed from previous work, as well as recent vendor quotes.

## Cost Analysis:

Cost for Reactive/GAC Placement for Technology Assignments (Lump Sum)

COST DATABASE CODE	DESCRIPTION	QTY	UNIT(S)	HPF	LABOR	ADJ LABOR	EQUIP	ADJ EQUIP	MATL	OTHER	UNMOD UC	UNMOD LIC	PC OH	PC PF	BUR LIC	COST SOURCE CITATION	COMMENTS
	Reactive/GAC Placement (Riverbanks)																
P40	Carbon (AquaGate + PAC 5%) Placement (Confined)	1,167	TON	1.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$816.75	\$816.75	\$953,147.25	0%	0%	\$953,147	P Previous Work	Adapted from unit cost developed by Anchor QEA (2010). Unit cost is \$/TON as carbon
M4	Carbon (AquaGate + PAC 5%)	1,167	TON	1.00	\$0.00	\$0.00	\$0.00	\$0.00	\$8,000.00	\$0.00	\$8,000.00	\$9,336,000.00	5%	0%	\$9,802,800	V Vendor Quote	Vendor Quote - AquaBlok 2015. Material cost is \$/TON (as Carbon).
	Reactive/GAC Placement (Confined)																
P40	Carbon (AquaGate + PAC 5%) Placement (Confined)	1,674	TON	1.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$816.75	\$816.75	\$1,367,239.50	0%	0%	\$1,367,240	P Previous Work	Adapted from unit cost developed by Anchor QEA (2010). Unit cost is \$/TON as carbon
M4	Carbon (AquaGate + PAC 5%)	1,674	TON	1.00	\$0.00	\$0.00	\$0.00	\$0.00	\$8,000.00	\$0.00	\$8,000.00	\$13,392,000.00	5%	0%	\$14,061,600	V Vendor Quote	Vendor Quote - AquaBlok 2015. Material cost is \$/TON (as Carbon).
	Reactive/GAC Placement (Open Water)																
P41	Carbon (AquaGate + PAC 5%) Placement (Open Water)	15,686	TON	1.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$396.00	\$396.00	\$6,211,656.00	0%	0%	\$6,211,656	P Previous Work	Adapted from unit cost developed by Anchor QEA (2010). Unit cost is \$/TON as carbon.
M4	Carbon (AquaGate + PAC 5%)	15,686	TON	1.00	\$0.00	\$0.00	\$0.00	\$0.00	\$8,000.00	\$0.00	\$8,000.00	\$125,488,000.00	5%	0%	\$131,762,400	V Vendor Quote	Vendor Quote - AquaBlok 2015. Material cost is \$/TON (as Carbon).
TOTAL UNIT COST:															\$164,158,843		

## Notes:

HTRW productivity factor is from Exhibit B-3 or B-4 of "A Guide to Developing and Documenting Cost Estimates During the Feasibility Study", EPA 2000

The Cost Database Code is a reference code for linking with line item cost information with the cost source database and is not otherwise used within these cost worksheets.

## Source of Cost Data:

NA Not Applicable - costs are from previous work or vendor quote

For citation references, the following sources apply:

MII (MII Assemblies), GSA (www.gsa.gov), FLC (www.flcdatcenter.com), A (Allowance), V (Vendor Quote), CW (Means CostWorks 2015), P (Previous Work), and FRTR (www.frtr.gov)

## Cost Adjustment Checklist:

## FACTOR:

H&S Productivity (labor and equipment only)

Escalation to Base Year

Area Cost Factor

Subcontractor Overhead and Profit

Prime Contractor Overhead and Profit

## NOTES:

Field work will be in Level "D" PPE.

MII assembly costs include HPF adjustments.

2015 cost sources are not escalated (EF=1.00). All other costs are escalated based on the USACE CWCCIS, EM 1110-2-1304, Mar 2015.

An AF of 1.05 is used for Oregon, except that an AF of 1.00 (national unmodified average) is used for MII assembly costs and local vendor quotes.

It is assumed that home office OH is 8% and profit is 9% for the Prime Contractor. Professional labor overhead is 100%. Allowances and items with mandated costs such as per diem do not have overhead and profit applied.

Items previously developed by Anchor QEA (2010) already include contractor markups, therefore overhead and profit were not applied to those items.

It is assumed that OH is 1% and profit is 0% for vendor quotes for treatment and disposal at offsite disposal facilities. It is assumed that OH is 5% and profit is 0% for quotes for all other material vendor quotes.

## Abbreviations:

QTY	Quantity	ACR	Acres
EQUIP	Equipment	BCY	Bank Cubic Yard
MATL	Material	CLF	100 Linear Foot
HPF	HTRW Productivity Factor	DY	Days
ADJ LABOR	Adjusted Labor for HFP	EA	Each
ADJ EQUIP	Adjusted Equipment for HFP	LF	Linear Foot
UNMOD UC	Unmodified Unit Cost	HR	Hours
UNMOD LIC	Unmodified Line Item Cost	LB	Pounds
UNBUR LIC	Unburdened Line Item Cost	LCY	Loose Cubic Yard
PC OH	Prime Contractor Overhead	LS	Lump Sum
PC PF	Prime Contractor Profit	RL	Roll
BUR LIC	Burdened Line Item Cost	SY	Square Yard
		TN	Tons

TABLE CW-F19

<div style="display: flex; justify-content: space-between;"> <span>Alternative F</span> <span>Cost Worksheet: CW-F19</span> </div> <div style="display: flex; justify-content: space-between; margin-top: 5px;"> <span>Capital Cost Sub-Element</span> <span><b>COST WORKSHEET</b></span> </div> <div style="display: flex; justify-content: space-between; margin-top: 5px;"> <span>Geofabric for Riverbanks</span> </div>																	
<b>Site:</b> Portland Harbor Superfund Site <b>Location:</b> Portland, Oregon <b>Phase:</b> Draft Feasibility Study <b>Base Year:</b> 2015												<b>Prepared By:</b> JN  <b>Checked By:</b> AS		<b>Date:</b> 7/27/2015  <b>Date:</b> 7/28/2015			
<b>Work Statement:</b> This sub-element involves the installation of geofabric along the riverbanks. It includes costs for on-site labor, equipment, and materials developed from previous work.																	
<b>Cost Analysis:</b> Cost for Geofabric for Riverbanks (Lump Sum)																	
COST DATABASE CODE	DESCRIPTION	QTY	UNIT(S)	HPF	LABOR	ADJ LABOR	EQUIP	ADJ EQUIP	MATL	OTHER	UNMOD UC	UNMOD LIC	PC OH	PC PF	BUR LIC	COST SOURCE CITATION	COMMENTS
P51	Geotextile Installation	21.8	AC	1.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$7,060.20	\$7,060.20	\$153,912.46	8%	9%	\$181,186	P Previous Work	Vendor Quote - Geo-Synthetics (2014). Includes labor and equipment for installation
M13	Geotextile	21.8	AC	1.00	\$0.00	\$0.00	\$0.00	\$0.00	\$5,687.39	\$0.00	\$5,687.39	\$123,985.10	5%	0%	\$130,184	V Vendor Quote	Vendor Quote (2014)
<b>TOTAL UNIT COST:</b>															\$311,370		
<div style="display: flex; justify-content: space-between;"> <div style="width: 60%;"> <b>Notes:</b>            HTRW productivity factor is from Exhibit B-3 or B-4 of "A Guide to Developing and Documenting Cost Estimates During the Feasibility Study", EPA 2000            The Cost Database Code is a reference code for linking with line item cost information with the cost source database and is not otherwise used within these cost worksheets.         </div> <div style="width: 35%;"> <b>Abbreviations:</b>            QTY Quantity            EQUIP Equipment            MATL Material            HPF HTRW Productivity Factor            ADJ LABOR Adjusted Labor for HFP            ADJ EQUIP Adjusted Equipment for HFP            UNMOD UC Unmodified Unit Cost            UNMOD LIC Unmodified Line Item Cost            UNBUR LIC Unburdened Line Item Cost            PC OH Prime Contractor Overhead            PC PF Prime Contractor Profit            BUR LIC Burdened Line Item Cost         </div> <div style="width: 5%;">           ACR Acres            BCY Bank Cubic Yard            CLF 100 Linear Foot            DY Days            EA Each            LF Linear Foot            HR Hours            LB Pounds            LCY Loose Cubic Yard            LS Lump Sum            RL Roll            SY Square Yard            TN Tons         </div> </div>																	
<div style="display: flex; justify-content: space-between;"> <div style="width: 40%;"> <b>Source of Cost Data:</b>            NA Not Applicable - costs are from previous work or vendor quote            For citation references, the following sources apply:            MII (MII Assemblies), GSA (www.gsa.gov), FLC (www.flcdatcenter.com), A (Allowance), V (Vendor Quote), CW (Means CostWorks 2015), P (Previous Work), and FRTR (www.frtr.gov)         </div> <div style="width: 60%;"> <b>NOTES:</b>            Field work will be in Level "D" PPE.            MII assembly costs include HPF adjustments.            2015 cost sources are not escalated (EF=1.00). All other costs are escalated based on the USACE CWCCIS, EM 1110-2-1304, Mar 2015.            An AF of 1.05 is used for Oregon, except that an AF of 1.00 (national unmodified average) is used for MII assembly costs and local vendor quotes.            It is assumed that home office OH is 8% and profit is 9% for the Prime Contractor. Professional labor overhead is 100%. Allowances and items with mandated costs such as per diem do not have overhead and profit applied.            Items previously developed by Anchor QEA (2010) already include contractor markups, therefore overhead and profit were not applied to those items.            It is assumed that OH is 1% and profit is 0% for vendor quotes for treatment and disposal at offsite disposal facilities. It is assumed that OH is 5% and profit is 0% for quotes for all other material vendor quotes.         </div> </div>																	
<b>Cost Adjustment Checklist:</b> FACTOR: H&S Productivity (labor and equipment only) Escalation to Base Year Area Cost Factor Subcontractor Overhead and Profit Prime Contractor Overhead and Profit																	

TABLE CW-F20

<div style="display: flex; justify-content: space-between;"> <div> <b>Alternative F</b>  <b>Capital Cost Sub-Element</b>  <b>Organoclay Mat Placement for Technology Assignments</b> </div> <div> <b>Cost Worksheet: CW-F20</b> </div> <div style="text-align: right;"> <b>COST WORKSHEET</b> </div> </div>																	
<b>Site:</b> Portland Harbor Superfund Site <b>Location:</b> Portland, Oregon <b>Phase:</b> Draft Feasibility Study <b>Base Year:</b> 2015												<b>Prepared By:</b> JN <b>Checked By:</b> AS		<b>Date:</b> 7/27/2015 <b>Date:</b> 7/28/2015			
<b>Work Statement:</b> This sub-element involves the placement of the organoclay mat for the construction of capping areas. It includes placement of the organoclay mat within confined areas as well as open water areas. It includes costs for on-site labor, equipment, and materials developed from previous work.																	
<b>Cost Analysis:</b> Cost for Organoclay Mat Placement for Technology Assignments (Lump Sum)																	
COST DATABASE CODE	DESCRIPTION	QTY	UNIT(S)	HPF	LABOR	ADJ LABOR	EQUIP	ADJ EQUIP	MATL	OTHER	UNMOD UC	UNMOD LIC	PC OH	PC PF	BUR LIC	COST SOURCE CITATION	COMMENTS
	<b>Organoclay Mat Placement (Riverbanks)</b>																
P23	Organoclay Mat Material and Placement (Confined)	43,560	SF	1.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$23.74	\$23.74	\$1,034,005.50	0%	0%	\$1,034,006	P Previous Work	Developed by Anchor QEA (2010)
	<b>Organoclay Mat Placement (Confined)</b>																
P23	Organoclay Mat Material and Placement (Confined)	139,392	SF	1.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$23.74	\$23.74	\$3,308,817.60	0%	0%	\$3,308,818	P Previous Work	Developed by Anchor QEA (2010)
	<b>Organoclay Mat Placement (Open Water)</b>																
P24	Organoclay Mat Material and Placement (Open)	710,028	SF	1.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$7.09	\$7.09	\$5,032,323.45	0%	0%	\$5,032,323	P Previous Work	Developed by Anchor QEA (2010)
												<b>TOTAL UNIT COST:</b>					
<div style="display: flex; justify-content: space-between;"> <div style="width: 60%;"> <b>Notes:</b>            HTRW productivity factor is from Exhibit B-3 or B-4 of "A Guide to Developing and Documenting Cost Estimates During the Feasibility Study", EPA 2000            The Cost Database Code is a reference code for linking with line item cost information with the cost source database and is not otherwise used within these cost worksheets.         </div> <div style="width: 35%;"> <b>Abbreviations:</b>            QTY Quantity            EQUIP Equipment            MATL Material            HPF HTRW Productivity Factor            ADJ LABOR Adjusted Labor for HFP            ADJ EQUIP Adjusted Equipment for HFP            UNMOD UC Unmodified Unit Cost            UNMOD LIC Unmodified Line Item Cost            UNBUR LIC Unburdened Line Item Cost            PC OH Prime Contractor Overhead            PC PF Prime Contractor Profit            BUR LIC Burdened Line Item Cost         </div> <div style="width: 5%;">           ACR Acres            BCY Bank Cubic Yard            CLF 100 Linear Foot            DY Days            EA Each            LF Linear Foot            HR Hours            LB Pounds            LCY Loose Cubic Yard            LS Lump Sum            RL Roll            SY Square Yard            TN Tons         </div> </div>																	
<div style="display: flex; justify-content: space-between;"> <div style="width: 60%;"> <b>Source of Cost Data:</b>            NA Not Applicable - costs are from previous work or vendor quote            For citation references, the following sources apply:            MII (MII Assemblies), GSA (www.gsa.gov), FLC (www.flcdatcenter.com), A (Allowance), V (Vendor Quote), CW (Means CostWorks 2015), P (Previous Work), and FRTR (www.frtr.gov)         </div> <div style="width: 35%;"> <b>Cost Adjustment Checklist:</b>            FACTOR:            H&amp;S Productivity (labor and equipment only)            Escalation to Base Year            Area Cost Factor            Subcontractor Overhead and Profit            Prime Contractor Overhead and Profit         </div> <div style="width: 5%;"> <b>NOTES:</b>            Field work will be in Level "D" PPE.            MII assembly costs include HPF adjustments.            2015 cost sources are not escalated (EF=1.00). All other costs are escalated based on the USACE CWCCIS, EM 1110-2-1304, Mar 2015.            An AF of 1.05 is used for Oregon, except that an AF of 1.00 (national unmodified average) is used for MII assembly costs and local vendor quotes.            It is assumed that home office OH is 8% and profit is 9% for the Prime Contractor. Professional labor overhead is 100%. Allowances and items with mandated costs such as per diem do not have overhead and profit applied.            Items previously developed by Anchor QEA (2010) already include contractor markups, therefore overhead and profit were not applied to those items.            It is assumed that OH is 1% and profit is 0% for vendor quotes for treatment and disposal at offsite disposal facilities. It is assumed that OH is 5% and profit is 0% for quotes for all other material vendor quotes.         </div> </div>																	

TABLE CW-F21

**Alternative F**  
**Capital Cost Sub-Element**  
**Transload Facility Development**

**Cost Worksheet: CW-F21**

# **COST WORKSHEET**

**Site:** Portland Harbor Superfund Site  
**Location:** Portland, Oregon  
**Phase:** Draft Feasibility Study  
**Base Year:** 2015

**Prepared By:** JN **Date:** 7/27/2015

**Checked By:** AS **Date:** 7/28/2015

**Work Statement:**

This sub-element involves the development of a transload facility for facilitating offsite disposal of contaminated sediments. It includes costs for on-site labor, equipment, and materials developed from previous work. Transload facility is expected to be operated for 12 years, based on estimated construction duration.

**Cost Analysis:**

Cost for Transload Facility Development (Lump Sum)

COST DATABASE CODE	DESCRIPTION	QTY	UNIT(S)	HPF	LABOR	ADJ LABOR	EQUIP	ADJ EQUIP	MATL	OTHER	UNMOD UC	UNMOD LIC	PC OH	PC PF	BUR LIC	COST SOURCE CITATION	COMMENTS
	Transload Facility Development																
P31	Transload Facility Permitting	1	LS	1.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$45,000.00	\$45,000.00	\$45,000.00	0%	0%	\$45,000	P Previous Work	Developed by Anchor QEA (2010)
P32	Transload Facility Development	1	LS	1.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$8,437,500.00	\$8,437,500.00	\$8,437,500.00	0%	0%	\$8,437,500	P Previous Work	Developed by Anchor QEA (2010)
P33	Yearly Property Lease	240	AC	1.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$26,437.50	\$26,437.50	\$6,345,000.00	0%	0%	\$6,345,000	P Previous Work	Developed by Anchor QEA (2010)
	Inspection and Monitoring of Transload Facility																
P34	Labor Inspections During Operations of Transload Facility	30.0	FTE	1.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$84,375.00	\$84,375.00	\$2,531,250.00	0%	0%	\$2,531,250	P Previous Work	Developed by Anchor QEA (2010)
P35	Environmental Monitoring During Offloading at Transload Facility	48	MO	1.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$16,875.00	\$16,875.00	\$810,000.00	0%	0%	\$810,000	P Previous Work	Developed by Anchor QEA (2010)
P36	Inspection and Monitoring Reporting for Transload Facility	12	YR	1.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$45,000.00	\$45,000.00	\$540,000.00	0%	0%	\$540,000	P Previous Work	Developed by Anchor QEA (2010)
<b>TOTAL UNIT COST:</b>															\$18,708,750		

**Notes:**

HTRW productivity factor is from Exhibit B-3 or B-4 of "A Guide to Developing and Documenting Cost Estimates During the Feasibility Study", EPA 2000  
The Cost Database Code is a reference code for linking with line item cost information with the cost source database and is not otherwise used within these cost worksheets.

**Source of Cost Data:**

NA Not Applicable - costs are from previous work or vendor quote

For citation references, the following sources apply:

MII (MII Assemblies), GSA (www.gsa.gov), FLC (www.flcdatcenter.com), A (Allowance), V (Vendor Quote), CW (Means CostWorks 2015), P (Previous Work), and FRTR (www.frtr.gov)

**Cost Adjustment Checklist:**

FACTOR:  
H&S Productivity (labor and equipment only)  
Escalation to Base Year  
Area Cost Factor  
Subcontractor Overhead and Profit  
Prime Contractor Overhead and Profit

**NOTES:**

Field work will be in Level "D" PPE.

MII assembly costs include HPF adjustments.

2015 cost sources are not escalated (EF=1.00). All other costs are escalated based on the USACE CWCCIS, EM 1110-2-1304, Mar 2015.

An AF of 1.05 is used for Oregon, except that an AF of 1.00 (national unmodified average) is used for MII assembly costs and local vendor quotes.

It is assumed that home office OH is 8% and profit is 9% for the Prime Contractor. Professional labor overhead is 100%. Allowances and items with mandated costs such as per diem do not have overhead and profit applied.

Items previously developed by Anchor QEA (2010) already include contractor markups, therefore overhead and profit were not applied to those items.

It is assumed that OH is 1% and profit is 0% for vendor quotes for treatment and disposal at offsite disposal facilities. It is assumed that OH is 5% and profit is 0% for quotes for all other material vendor quotes.

**Abbreviations:**

QTY	Quantity	ACR	Acres
EQUIP	Equipment	BCY	Bank Cubic Yard
MATL	Material	CLF	100 Linear Foot
HPF	HTRW Productivity Factor	DY	Days
ADJ LABOR	Adjusted Labor for HFP	EA	Each
ADJ EQUIP	Adjusted Equipment for HFP	LF	Linear Foot
UNMOD UC	Unmodified Unit Cost	HR	Hours
UNMOD LIC	Unmodified Line Item Cost	LB	Pounds
UNBUR LIC	Unburdened Line Item Cost	LCY	Loose Cubic Yard
PC OH	Prime Contractor Overhead	LS	Lump Sum
PC PF	Prime Contractor Profit	RL	Roll
BUR LIC	Burdened Line Item Cost	SY	Square Yard
		TN	Tons

TABLE CW-F22

TABLE CW-F22																				
<div style="display: flex; justify-content: space-between;"> <div> <b>Alternative F</b>  <b>Capital Cost Sub-Element</b>  <b>Monitored Natural Recovery (MNR) for MNR/Enhanced Monitored Natural Recovery (EMNR) and Broadcast GAC Areas</b> </div> <div style="text-align: right;"> <b>COST WORKSHEET</b> </div> </div>																				
<b>Site:</b> Portland Harbor Superfund Site <b>Location:</b> Portland, Oregon <b>Phase:</b> Draft Feasibility Study <b>Base Year:</b> 2015										<b>Prepared By:</b> JN <b>Checked By:</b> AS <b>Date:</b> 7/27/2015 <b>Date:</b> 7/28/2015										
<b>Work Statement:</b> This sub-element involves sampling as part of monitored natural recovery for MNR, EMNR, and Broadcast GAC areas. It includes costs for on-site labor, equipment, and materials developed from previous work.																				
<b>Cost Analysis:</b> Cost for Monitored Natural Recovery for MNR/EMNR and Broadcast GAC Areas (Lump Sum)																				
COST DATABASE CODE	DESCRIPTION	QTY	UNIT(S)	HPF	LABOR	ADJ LABOR	EQUIP	ADJ EQUIP	MATL	OTHER	UNMOD UC	UNMOD LIC	PC OH	PC PF	BUR LIC	COST SOURCE CITATION	COMMENTS			
P25	Monitored Natural Recovery	2,131	AC	1.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$3,679.79	\$3,679.79	\$7,841,621.84	0%	0%	\$7,841,622	P Previous Work	Developed by Anchor QEA (2010)			
												TOTAL UNIT COST:		\$7,841,622						
<b>Notes:</b> HTRW productivity factor is from Exhibit B-3 or B-4 of "A Guide to Developing and Documenting Cost Estimates During the Feasibility Study", EPA 2000 The Cost Database Code is a reference code for linking with line item cost information with the cost source database and is not otherwise used within these cost worksheets.															<b>Abbreviations:</b> QTY Quantity EQUIP Equipment MATL Material HPF HTRW Productivity Factor ADJ LABOR Adjusted Labor for HFP ADJ EQUIP Adjusted Equipment for HFP UNMOD UC Unmodified Unit Cost UNMOD LIC Unmodified Line Item Cost UNBUR LIC Unburdened Line Item Cost PC OH Prime Contractor Overhead PC PF Prime Contractor Profit BUR LIC Burdened Line Item Cost			ACR Acres BCY Bank Cubic Yard CLF 100 Linear Foot DY Days EA Each LF Linear Foot HR Hours LB Pounds LCY Loose Cubic Yard LS Lump Sum RL Roll SY Square Yard TN Tons		
<b>Source of Cost Data:</b> NA Not Applicable - costs are from previous work or vendor quote For citation references, the following sources apply: MII (MII Assemblies), GSA (www.gsa.gov), FLC (www.flcdatabase.com), A (Allowance), V (Vendor Quote), CW (Means CostWorks 2015), P (Previous Work), and FRTR (www.frtr.gov)															<b>Cost Adjustment Checklist:</b> FACTOR: H&S Productivity (labor and equipment only) Escalation to Base Year Area Cost Factor Subcontractor Overhead and Profit Prime Contractor Overhead and Profit			<b>NOTES:</b> Field work will be in Level "D" PPE. MII assembly costs include HPF adjustments. 2015 cost sources are not escalated (EF=1.00). All other costs are escalated based on the USACE CWCCIS, EM 1110-2-1304, Mar 2015. An AF of 1.05 is used for Oregon, except that an AF of 1.00 (national unmodified average) is used for MII assembly costs and local vendor quotes. It is assumed that home office OH is 8% and profit is 9% for the Prime Contractor. Professional labor overhead is 100%. Allowances and items with mandated costs such as per diem do not have overhead and profit applied. Items previously developed by Anchor QEA (2010) already include contractor markups, therefore overhead and profit were not applied to those items. It is assumed that OH is 1% and profit is 0% for vendor quotes for treatment and disposal at offsite disposal facilities. It is assumed that OH is 5% and profit is 0% for quotes for all other material vendor quotes.		

TABLE CW-F23

<div style="display: flex; justify-content: space-between;"> <div> <b>Alternative F</b>  <b>Capital Cost Sub-Element</b>  <b>Site-Wide Monitoring</b> </div> <div> <b>Cost Worksheet: CW-F23</b> </div> <div style="text-align: right;"> <b>COST WORKSHEET</b> </div> </div>																	
<b>Site:</b> Portland Harbor Superfund Site <b>Location:</b> Portland, Oregon <b>Phase:</b> Draft Feasibility Study <b>Base Year:</b> 2015												<b>Prepared By:</b> JN  <b>Checked By:</b> AS		<b>Date:</b> 7/27/2015  <b>Date:</b> 7/28/2015			
<b>Work Statement:</b> This sub-element involves sampling, surveying, data management, and reporting as part of sitewide monitoring. It includes costs for on-site labor, equipment, and materials developed from previous work.																	
<b>Cost Analysis:</b> Cost for Site-Wide Monitoring (Lump Sum)																	
COST DATABASE CODE	DESCRIPTION	QTY	UNIT(S)	HPF	LABOR	ADJ LABOR	EQUIP	ADJ EQUIP	MATL	OTHER	UNMOD UC	UNMOD LIC	PC OH	PC PF	BUR LIC	COST SOURCE CITATION	COMMENTS
	Site-Wide Monitoring																
P26	Sitewide Monitoring	1	LS	1.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$955,959.75	\$955,959.75	\$955,959.75	0%	0%	\$955,960	P Previous Work	Includes onsite dust control and pavement washing
<b>TOTAL UNIT COST:</b>															\$955,960		
<div style="display: flex; justify-content: space-between;"> <div style="width: 60%;"> <b>Notes:</b>            HTRW productivity factor is from Exhibit B-3 or B-4 of "A Guide to Developing and Documenting Cost Estimates During the Feasibility Study", EPA 2000            The Cost Database Code is a reference code for linking with line item cost information with the cost source database and is not otherwise used within these cost worksheets.   <b>Source of Cost Data:</b>            NA Not Applicable - costs are from previous work or vendor quote            For citation references, the following sources apply:            MII (MII Assemblies), GSA (www.gsa.gov), FLC (www.flcdatcenter.com), A (Allowance), V (Vendor Quote), CW (Means CostWorks 2015), P (Previous Work), and FRTR (www.frtr.gov)         </div> <div style="width: 35%;"> <b>Abbreviations:</b>            QTY Quantity            EQUIP Equipment            MATL Material            HPF HTRW Productivity Factor            ADJ LABOR Adjusted Labor for HFP            ADJ EQUIP Adjusted Equipment for HFP            UNMOD UC Unmodified Unit Cost            UNMOD LIC Unmodified Line Item Cost            UNBUR LIC Unburdened Line Item Cost            PC OH Prime Contractor Overhead            PC PF Prime Contractor Profit            BUR LIC Burdened Line Item Cost             ACR Acres            BCY Bank Cubic Yard            CLF 100 Linear Foot            DY Days            EA Each            LF Linear Foot            HR Hours            LB Pounds            LCY Loose Cubic Yard            LS Lump Sum            RL Roll            SY Square Yard            TN Tons         </div> </div>																	
<b>Cost Adjustment Checklist:</b> FACTOR: Field work will be in Level "D" PPE. H&S Productivity (labor and equipment only) MII assembly costs include HPF adjustments. Escalation to Base Year 2015 cost sources are not escalated (EF=1.00). All other costs are escalated based on the USACE CWCCIS, EM 1110-2-1304, Mar 2015. Area Cost Factor An AF of 1.05 is used for Oregon, except that an AF of 1.00 (national unmodified average) is used for MII assembly costs and local vendor quotes. Subcontractor Overhead and Profit It is assumed that home office OH is 8% and profit is 9% for the Prime Contractor. Professional labor overhead is 100%. Allowances and items with mandated costs such as per diem do not have overhead and profit applied. Prime Contractor Overhead and Profit Items previously developed by Anchor QEA (2010) already include contractor markups, therefore overhead and profit were not applied to those items. It is assumed that OH is 1% and profit is 0% for vendor quotes for treatment and disposal at offsite disposal facilities. It is assumed that OH is 5% and profit is 0% for quotes for all other material vendor quotes.																	

TABLE CW-F24

<b>TABLE CW-F24</b>																																													
<b>Alternative F</b> <b>Capital Cost Sub-Element</b> <b>Cap Area Monitoring and Reactive Layer Monitoring</b>										<b>Cost Worksheet: CW-F24</b>  <div style="text-align: right; font-weight: bold; font-size: 1.2em;">COST WORKSHEET</div>																																			
<b>Site:</b> Portland Harbor Superfund Site <b>Location:</b> Portland, Oregon <b>Phase:</b> Draft Feasibility Study <b>Base Year:</b> 2015										<b>Prepared By:</b> JN <b>Checked By:</b> AS <b>Date:</b> 7/27/2015 <b>Date:</b> 7/28/2015																																			
<b>Work Statement:</b> This sub-element involves sampling, surveying, data management, and reporting as part of cap and reactive layer monitoring. It includes costs for on-site labor, equipment, and materials developed from previous work.																																													
<b>Cost Analysis:</b> Cost for Cap and Reactive Layer Monitoring (Lump Sum)																																													
COST DATABASE CODE	DESCRIPTION	QTY	UNIT(S)	HPF	LABOR	ADJ LABOR	EQUIP	ADJ EQUIP	MATL	OTHER	UNMOD UC	UNMOD LIC	PC OH	PC PF	BUR LIC	COST SOURCE CITATION	COMMENTS																												
	Cap Area Monitoring																																												
P27	Cap Monitoring	303	AC	1.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$78,821.21	\$78,821.21	\$23,898,591.63	0%	0%	\$23,898,592	P Previous Work	Developed by Anchor QEA (2010)																												
	<b>Reactive Layer Monitoring</b>																																												
P28	Reactive Layer Monitoring	238	AC	1.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$88,810.88	\$88,810.88	\$21,092,582.81	0%	0%	\$21,092,583	P Previous Work	Developed by Anchor QEA (2010)																												
												TOTAL UNIT COST:		\$44,991,175																															
<b>Notes:</b> HTRW productivity factor is from Exhibit B-3 or B-4 of "A Guide to Developing and Documenting Cost Estimates During the Feasibility Study", EPA 2000 The Cost Database Code is a reference code for linking with line item cost information with the cost source database and is not otherwise used within these cost worksheets.																																													
<b>Source of Cost Data:</b> NA Not Applicable - costs are from previous work or vendor quote For citation references, the following sources apply: MII (MII Assemblies), GSA (www.gsa.gov), FLC (www.flcdatcenter.com), A (Allowance), V (Vendor Quote), CW (Means CostWorks 2015), P (Previous Work), and FRTR (www.frtr.gov)										<b>Abbreviations:</b> <table style="width: 100%; border: none;"> <tr> <td style="width: 50%;">QTY Quantity</td> <td style="width: 50%;">ACR Acres</td> </tr> <tr> <td>EQUIP Equipment</td> <td>BCY Bank Cubic Yard</td> </tr> <tr> <td>MATL Material</td> <td>CLF 100 Linear Foot</td> </tr> <tr> <td>HPF HTRW Productivity Factor</td> <td>DY Days</td> </tr> <tr> <td>ADJ LABOR Adjusted Labor for HFP</td> <td>EA Each</td> </tr> <tr> <td>ADJ EQUIP Adjusted Equipment for HFP</td> <td>LF Linear Foot</td> </tr> <tr> <td>UNMOD UC Unmodified Unit Cost</td> <td>HR Hours</td> </tr> <tr> <td>UNMOD LIC Unmodified Line Item Cost</td> <td>LB Pounds</td> </tr> <tr> <td>UNBUR LIC Unburdened Line Item Cost</td> <td>LCY Loose Cubic Yard</td> </tr> <tr> <td>PC OH Prime Contractor Overhead</td> <td>LS Lump Sum</td> </tr> <tr> <td>PC PF Prime Contractor Profit</td> <td>RL Roll</td> </tr> <tr> <td>BUR LIC Burdened Line Item Cost</td> <td>SY Square Yard</td> </tr> <tr> <td></td> <td>TN Tons</td> </tr> </table>										QTY Quantity	ACR Acres	EQUIP Equipment	BCY Bank Cubic Yard	MATL Material	CLF 100 Linear Foot	HPF HTRW Productivity Factor	DY Days	ADJ LABOR Adjusted Labor for HFP	EA Each	ADJ EQUIP Adjusted Equipment for HFP	LF Linear Foot	UNMOD UC Unmodified Unit Cost	HR Hours	UNMOD LIC Unmodified Line Item Cost	LB Pounds	UNBUR LIC Unburdened Line Item Cost	LCY Loose Cubic Yard	PC OH Prime Contractor Overhead	LS Lump Sum	PC PF Prime Contractor Profit	RL Roll	BUR LIC Burdened Line Item Cost	SY Square Yard		TN Tons
QTY Quantity	ACR Acres																																												
EQUIP Equipment	BCY Bank Cubic Yard																																												
MATL Material	CLF 100 Linear Foot																																												
HPF HTRW Productivity Factor	DY Days																																												
ADJ LABOR Adjusted Labor for HFP	EA Each																																												
ADJ EQUIP Adjusted Equipment for HFP	LF Linear Foot																																												
UNMOD UC Unmodified Unit Cost	HR Hours																																												
UNMOD LIC Unmodified Line Item Cost	LB Pounds																																												
UNBUR LIC Unburdened Line Item Cost	LCY Loose Cubic Yard																																												
PC OH Prime Contractor Overhead	LS Lump Sum																																												
PC PF Prime Contractor Profit	RL Roll																																												
BUR LIC Burdened Line Item Cost	SY Square Yard																																												
	TN Tons																																												
<b>Cost Adjustment Checklist:</b> FACTOR: H&S Productivity (labor and equipment only) Escalation to Base Year Area Cost Factor Subcontractor Overhead and Profit Prime Contractor Overhead and Profit										<b>NOTES:</b> Field work will be in Level "D" PPE. MII assembly costs include HPF adjustments. 2015 cost sources are not escalated (EF=1.00). All other costs are escalated based on the USACE CWCCIS, EM 1110-2-1304, Mar 2015. An AF of 1.05 is used for Oregon, except that an AF of 1.00 (national unmodified average) is used for MII assembly costs and local vendor quotes. It is assumed that home office OH is 8% and profit is 9% for the Prime Contractor. Professional labor overhead is 100%. Allowances and items with mandated costs such as per diem do not have overhead and profit applied. Items previously developed by Anchor QEA (2010) already include contractor markups, therefore overhead and profit were not applied to those items. It is assumed that OH is 1% and profit is 0% for vendor quotes for treatment and disposal at offsite disposal facilities. It is assumed that OH is 5% and profit is 0% for quotes for all other material vendor quotes.																																			



TABLE CW-F25

Alternative F Cost Worksheet: CW-F25																	COST WORKSHEET	
Capital Cost Sub-Element																		
Long-Term Maintenance for Capping, EMNR, and In Situ Treatment																		
Site: Portland Harbor Superfund Site										Prepared By: AB				Date: 8/11/2015				
Location: Portland, Oregon																		
Phase: Draft Feasibility Study										Checked By: JN				Date: 8/12/2015				
Base Year: 2015																		
Work Statement:																		
This sub-element involves replacement of 5% of the technology assignment layers as part of long-term maintenance. It includes costs for on-site labor, equipment, and materials developed from previous work.																		
Cost Analysis:																		
Cost for Long-Term Maintenance (Lump Sum)																		
COST DATABASE CODE	DESCRIPTION	QTY	UNIT(S)	HPF	LABOR	ADJ LABOR	EQUIP	ADJ EQUIP	MATL	OTHER	UNMOD UC	UNMOD LIC	PC OH	PC PF	BUR LIC	COST SOURCE CITATION	COMMENTS	
Mobilization / Demobilization																		
M16	Mobilization/Demobilization for Long Term Maintenance	1	LS	1.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$207,307.17	\$207,307.17	\$207,307.17	0%	0%	\$207,307	A Previous Work	Assumes 1.6% of total capital costs per Lower Duwamish. See Calculations for derivation.	
Sand Placement for Technology Assignments																		
Sand Placement (Riverbanks)																		
P2	Sand Placement (Confined)	2,969	LCY	1.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$49.01	\$49.01	\$145,495.85	0%	0%	\$145,496	P Previous Work	Assume 5% of placement of additional material	
M1	Sand	2,969	LCY	1.00	\$0.00	\$0.00	\$0.00	\$0.00	\$19.71	\$0.00	\$19.71	\$58,518.99	0%	0%	\$58,519	P Previous Work	Assume 5% of placement of additional material	
Sand Placement (Confined)																		
P2	Sand Placement (Confined)	6,520	LCY	1.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$49.01	\$49.01	\$319,512.60	0%	0%	\$319,513	P Previous Work	Assume 5% of placement of additional material	
M1	Sand	6,520	LCY	1.00	\$0.00	\$0.00	\$0.00	\$0.00	\$19.71	\$0.00	\$19.71	\$128,509.20	0%	0%	\$128,509	P Previous Work	Assume 5% of placement of additional material	
Sand Placement (Open Water)																		
P6	Sand Placement (Open Water)	60,501	LCY	1.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$23.76	\$23.76	\$1,437,503.76	0%	0%	\$1,437,504	P Previous Work	Assume 5% of placement of additional material	
M1	Sand	60,501	LCY	1.00	\$0.00	\$0.00	\$0.00	\$0.00	\$19.71	\$0.00	\$19.71	\$1,192,474.71	0%	0%	\$1,192,475	P Previous Work	Assume 5% of placement of additional material	
Beach Mix Placement for Technology Assignments																		
Beach Mix Placement (Riverbanks)																		
P5	Beach Mix Placement (Confined)	488	LCY	1.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$58.50	\$58.50	\$28,548.00	0%	0%	\$28,548	P Previous Work	Assume 5% of placement of additional material	
M5	ODOT 100 Beach Mix	488	LCY	1.00	\$0.00	\$0.00	\$0.00	\$0.00	\$57.59	\$0.00	\$57.59	\$28,103.92	0%	0%	\$28,104	P Previous Work	Assume 5% of placement of additional material	
Beach Mix Placement (Confined)																		
P5	Beach Mix Placement (Confined)	173	LCY	1.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$58.50	\$58.50	\$10,120.50	0%	0%	\$10,121	P Previous Work	Assume 5% of placement of additional material	
M5	ODOT 100 Beach Mix	173	LCY	1.00	\$0.00	\$0.00	\$0.00	\$0.00	\$57.59	\$0.00	\$57.59	\$9,963.07	0%	0%	\$9,963	P Previous Work	Assume 5% of placement of additional material	
Beach Mix Placement (Open Water)																		
P39	Beach Mix Placement (Open Water)	1,845	LCY	1.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$28.34	\$28.34	\$52,284.99	0%	0%	\$52,285	P Previous Work	Assume 5% of placement of additional material	
M5	ODOT 100 Beach Mix	1,845	LCY	1.00	\$0.00	\$0.00	\$0.00	\$0.00	\$57.59	\$0.00	\$57.59	\$106,253.55	0%	0%	\$106,254	P Previous Work	Assume 5% of placement of additional material	
Armor Placement for Technology Assignments																		
Armor Placement (Riverbanks)																		
P3	ODOT 200 Placement (Confined)	549	LCY	1.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$58.50	\$58.50	\$32,116.50	0%	0%	\$32,117	P Previous Work	Assume 5% of placement of additional material	
M2	ODOT 200 Armor	549	LCY	1.00	\$0.00	\$0.00	\$0.00	\$0.00	\$57.59	\$0.00	\$57.59	\$31,616.91	0%	0%	\$31,617	P Previous Work	Assume 5% of placement of additional material	
Armor Placement (Confined)																		
P3	ODOT 200 Placement (Confined)	1,802	LCY	1.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$58.50	\$58.50	\$105,417.00	0%	0%	\$105,417	P Previous Work	Assume 5% of placement of additional material	
M2	ODOT 200 Armor	1,802	LCY	1.00	\$0.00	\$0.00	\$0.00	\$0.00	\$57.59	\$0.00	\$57.59	\$103,777.18	0%	0%	\$103,777	P Previous Work	Assume 5% of placement of additional material	
Armor Placement (Open Water)																		
P7	ODOT 200 Placement (Open Water)	5,553	LCY	1.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$28.34	\$28.34	\$157,365.08	0%	0%	\$157,365	P Previous Work	Assume 5% of placement of additional material	
M2	ODOT 200 Armor	5,553	LCY	1.00	\$0.00	\$0.00	\$0.00	\$0.00	\$57.59	\$0.00	\$57.59	\$319,797.27	0%	0%	\$319,797	P Previous Work	Assume 5% of placement of additional material	
Reactive/GAC Placement for Technology Assignments																		
Reactive/GAC Placement (Riverbanks)																		
P40	Carbon (AquaGate + PAC 5%) Placement (Confined)	58	TON	1.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$816.75	\$816.75	\$47,371.50	0%	0%	\$47,372	P Previous Work	Assume 5% of placement of additional material	
M4	Carbon (AquaGate + PAC 5%)	58	TON	1.00	\$0.00	\$0.00	\$0.00	\$0.00	\$8,000.00	\$0.00	\$8,000.00	\$464,000.00	5%	0%	\$487,200	V Vendor Quote	Assume 5% of placement of additional material	
Reactive/GAC Placement (Confined)																		
P40	Carbon (AquaGate + PAC 5%) Placement (Confined)	84	TON	1.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$816.75	\$816.75	\$68,607.00	0%	0%	\$68,607	P Previous Work	Assume 5% of placement of additional material	
M4	Carbon (AquaGate + PAC 5%)	84	TON	1.00	\$0.00	\$0.00	\$0.00	\$0.00	\$8,000.00	\$0.00	\$8,000.00	\$672,000.00	5%	0%	\$705,600	V Vendor Quote	Assume 5% of placement of additional material	

TABLE CW-F25

**Alternative F**                      **Cost Worksheet: CW-F25**  
**Capital Cost Sub-Element**  
**Long-Term Maintenance for Capping, EMNR, and In Situ Treatment**

**COST WORKSHEET**

**Site:** Portland Harbor Superfund Site                      **Prepared By:** AB                      **Date:** 8/11/2015  
**Location:** Portland, Oregon  
**Phase:** Draft Feasibility Study                      **Checked By:** JN                      **Date:** 8/12/2015  
**Base Year:** 2015

**Work Statement:**

This sub-element involves replacement of 5% of the technology assignment layers as part of long-term maintenance. It includes costs for on-site labor, equipment, and materials developed from previous work.

**Cost Analysis:**

Cost for Long-Term Maintenance (Lump Sum)

COST DATABASE CODE	DESCRIPTION	QTY	UNIT(S)	HPF	LABOR	ADJ LABOR	EQUIP	ADJ EQUIP	MATL	OTHER	UNMOD UC	UNMOD LIC	PC OH	PC PF	BUR LIC	COST SOURCE CITATION	COMMENTS
	<b>Reactive/GAC Placement (Open Water)</b>																
P41	Carbon (AquaGate + PAC 5%) Placement (Open Water)	784	TON	1.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$396.00	\$396.00	\$310,464.00	0%	0%	\$310,464	P Previous Work	Assume 5% of placement of additional material
M4	Carbon (AquaGate + PAC 5%)	784	TON	1.00	\$0.00	\$0.00	\$0.00	\$0.00	\$8,000.00	\$0.00	\$8,000.00	\$6,272,000.00	5%	0%	\$6,585,600	V Vendor Quote	Assume 5% of placement of additional material
	<b>Geofabric for Riverbanks</b>																
P51	Geotextile Installation	1.1	AC	1.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$7,060.20	\$7,060.20	\$7,766.23	8%	9%	\$9,142	P Previous Work	Assume 5% of placement of additional material
M13	Geotextile	1.1	AC	1.00	\$0.00	\$0.00	\$0.00	\$0.00	\$5,687.39	\$0.00	\$5,687.39	\$6,256.13	5%	0%	\$6,569	V Vendor Quote	Assume 5% of placement of additional material
	<b>Organoclay Mat Placement for Technology Assignments</b>																
	<b>Organoclay Mat Placement (Riverbanks)</b>																
P23	(Confined)	2,178	SF	1.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$23.74	\$23.74	\$51,700.28	0%	0%	\$51,700	P Previous Work	Assume 5% of placement of additional material
	<b>Organoclay Mat Placement (Confined)</b>																
P23	(Confined)	6,970	SF	1.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$23.74	\$23.74	\$165,450.38	0%	0%	\$165,450	P Previous Work	Assume 5% of placement of additional material
	<b>Organoclay Mat Placement (Open Water)</b>																
P24	Organoclay Mat Material and Placement (Open)	35,501	SF	1.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$7.09	\$7.09	\$251,613.34	0%	0%	\$251,613	P Previous Work	Assume 5% of placement of additional material
<b>TOTAL UNIT COST:</b>															<b>\$13,164,005</b>		

**Notes:**

HTRW productivity factor is from Exhibit B-3 or B-4 of "A Guide to Developing and Documenting Cost Estimates During the Feasibility Study", EPA 2000  
The Cost Database Code is a reference code for linking with line item cost information with the cost source database and is not otherwise used within these cost worksheets.

**Source of Cost Data:**

NA Not Applicable - costs are from previous work or vendor quote

For citation references, the following sources apply:

MII (MII Assemblies), GSA (www.gsa.gov), FLC (www.flcdatcenter.com), A (Allowance), V (Vendor Quote), CW (Means CostWorks 2015), P (Previous Work), and FRTR (www.frtr.gov)

**Cost Adjustment Checklist:**

FACTOR:  
H&S Productivity (labor and equipment only)  
Escalation to Base Year  
Area Cost Factor  
Subcontractor Overhead and Profit  
Prime Contractor Overhead and Profit

**NOTES:**

Field work will be in Level "D" PPE.  
MII assembly costs include HPF adjustments.  
2015 cost sources are not escalated (EF=1.00). All other costs are escalated based on the USACE CWCCIS, EM 1110-2-1304, Mar 2015.  
An AF of 1.05 is used for Oregon, except that an AF of 1.00 (national unmodified average) is used for MII assembly costs and local vendor quotes.  
It is assumed that home office OH is 8% and profit is 9% for the Prime Contractor. Professional labor overhead is 100%. Allowances and items with mandated costs such as per diem do not have overhead and profit applied.  
Items previously developed by Anchor QEA (2010) already include contractor markups, therefore overhead and profit were not applied to those items.  
It is assumed that OH is 1% and profit is 0% for vendor quotes for treatment and disposal at offsite disposal facilities. It is assumed that OH is 5% and profit is 0% for quotes for all other material vendor quotes.

**Abbreviations:**

QTY	Quantity	ACR	Acres
EQUIP	Equipment	BCY	Bank Cubic Yard
MATL	Material	CLF	100 Linear Foot
HPF	HTRW Productivity Factor	DY	Days
ADJ LABOR	Adjusted Labor for HFP	EA	Each
ADJ EQUIP	Adjusted Equipment for HFP	LF	Linear Foot
UNMOD UC	Unmodified Unit Cost	HR	Hours
UNMOD LIC	Unmodified Line Item Cost	LB	Pounds
UNBUR LIC	Unburdened Line Item Cost	LCY	Loose Cubic Yard
PC OH	Prime Contractor Overhead	LS	Lump Sum
PC PF	Prime Contractor Profit	RL	Roll
BUR LIC	Burdened Line Item Cost	SY	Square Yard
		TN	Tons

TABLE CW-F26

**Alternative F**  
**Capital Cost Sub-Element**  
**5-Year Site Review**

**Cost Worksheet: CW-F26**

**COST WORKSHEET**

**Site:** Portland Harbor Superfund Site  
**Location:** Portland, Oregon  
**Phase:** Draft Feasibility Study  
**Base Year:** 2015

**Prepared By:** JN **Date:** 7/27/2015

**Checked By:** AS **Date:** 7/28/2015

**Work Statement:**

This sub-element involves the site visit and 5-year site review report. The following cost includes labor, material and shipping costs for site visits and 5-year site review reports.

**Cost Analysis:**

Cost for 5-Year Site Review (Lump Sum)

COST DATABASE CODE	DESCRIPTION	QTY	UNIT(S)	HPF	LABOR	ADJ LABOR	EQUIP	ADJ EQUIP	MATL	OTHER	UNMOD UC	UNMOD LIC	PC OH	PC PF	BUR LIC	COST SOURCE CITATION	COMMENTS
L11	Project Manager	300	HR	1.00	\$82.17	\$82.17	\$0.00	\$0.00	\$0.00	\$0.00	\$82.17	\$24,651.00	100%	9%	\$53,739	FLC FLCDataCenter	
L4	Environmental Engineer	600	HR	1.00	\$48.91	\$48.91	\$0.00	\$0.00	\$0.00	\$0.00	\$48.91	\$29,346.00	100%	9%	\$63,974	FLC FLCDataCenter	
L6	Environmental Scientist	900	HR	1.00	\$37.70	\$37.70	\$0.00	\$0.00	\$0.00	\$0.00	\$37.70	\$33,930.00	100%	9%	\$73,967	FLC FLCDataCenter	
L12	Quality Control Engineer	120	HR	1.00	\$64.99	\$64.99	\$0.00	\$0.00	\$0.00	\$0.00	\$64.99	\$7,798.80	100%	9%	\$17,001	FLC FLCDataCenter	
L1	CAD Drafter	300	HR	1.00	\$31.31	\$31.31	\$0.00	\$0.00	\$0.00	\$0.00	\$31.31	\$9,393.00	100%	9%	\$20,477	FLC FLCDataCenter	
L3	Clerks, Typist, Bookkeeper & Receptionist	300	HR	1.00	\$19.89	\$19.89	\$0.00	\$0.00	\$0.00	\$0.00	\$19.89	\$5,967.00	100%	9%	\$13,008	FLC FLCDataCenter	
M14	Copy and Shipping Allowance	1	LS	1.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$1,500.00	\$1,500.00	\$1,500.00	0%	0%	\$1,500	A Allowance	
<b>TOTAL UNIT COST:</b>															<b>\$243,666</b>		

**Notes:**

HTRW productivity factor is from Exhibit B-3 or B-4 of "A Guide to Developing and Documenting Cost Estimates During the Feasibility Study", EPA 2000

The Cost Database Code is a reference code for linking with line item cost information with the cost source database and is not otherwise used within these cost worksheets.

**Source of Cost Data:**

NA Not Applicable - costs are from previous work or vendor quote

For citation references, the following sources apply:

MII (MII Assemblies), GSA (www.gsa.gov), FLC (www.flcdatacenter.com), A (Allowance), V (Vendor Quote), CW (Means CostWorks 2015), P (Previous Work), and FRTR (www.ftr.gov)

**Cost Adjustment Checklist:**

FACTOR:  
H&S Productivity (labor and equipment only)  
Escalation to Base Year  
Area Cost Factor  
Subcontractor Overhead and Profit  
Prime Contractor Overhead and Profit

**NOTES:**

Field work will be in Level "D" PPE.

MI assembly costs include HPF adjustments.

2015 cost sources are not escalated (EF=1.00). All other costs are escalated based on the USACE CWCCIS, EM 1110-2-1304, Mar 2015.

An AF of 1.05 is used for Oregon, except that an AF of 1.00 (national unmodified average) is used for MII assembly costs and local vendor quotes.

It is assumed that home office OH is 8% and profit is 9% for the Prime Contractor. Professional labor overhead is 100%. Allowances and items with mandated costs such as per diem do not have overhead and profit applied.

Items previously developed by Anchor QEA (2010) already include contractor markups, therefore overhead and profit were not applied to those items.

It is assumed that OH is 1% and profit is 0% for vendor quotes for treatment and disposal at offsite disposal facilities. It is assumed that OH is 5% and profit is 0% for quotes for all other material vendor quotes.

**Abbreviations:**

QTY	Quantity	ACR	Acres
EQUIP	Equipment	BCY	Bank Cubic Yard
MATL	Material	CLF	100 Linear Foot
HPF	HTRW Productivity Factor	DY	Days
ADJ LABOR	Adjusted Labor for HFP	EA	Each
ADJ EQUIP	Adjusted Equipment for HFP	LF	Linear Foot
UNMOD UC	Unmodified Unit Cost	HR	Hours
UNMOD LIC	Unmodified Line Item Cost	LB	Pounds
UNBUR LIC	Unburdened Line Item Cost	LCY	Loose Cubic Yard
PC OH	Prime Contractor Overhead	LS	Lump Sum
PC PF	Prime Contractor Profit	RL	Roll
BUR LIC	Burdened Line Item Cost	SY	Square Yard
		TN	Tons

**Cost Worksheets**  
**Alternative G**

TABLE CW-G1

TABLE CW-G1																																																																					
<b>Alternative G</b> <b>Capital Cost Sub-Element</b> <b>Mobilization / Demobilization</b>		<b>Cost Worksheet: CW-G1</b>										<b>COST WORKSHEET</b>																																																									
<b>Site:</b> Portland Harbor Superfund Site												<b>Prepared By:</b> AB		<b>Date:</b> 8/11/2015																																																							
<b>Location:</b> Portland, Oregon																																																																					
<b>Phase:</b> Draft Feasibility Study												<b>Checked By:</b> JN		<b>Date:</b> 8/12/2015																																																							
<b>Base Year:</b> 2015																																																																					
<b>Work Statement:</b> This sub-element involves mobilization and demobilization of all the required equipment to and from the site respectively.																																																																					
<b>Cost Analysis:</b> Cost for Mobilization/Demobilization (Lump Sum)																																																																					
COST DATABASE CODE	DESCRIPTION	QTY	UNIT(S)	HPF	LABOR	ADJ LABOR	EQUIP	ADJ EQUIP	MATL	OTHER	UNMOD UC	UNMOD LIC	PC OH	PC PF	BUR LIC	COST SOURCE CITATION	COMMENTS																																																				
M15	Mobilization/Demobilization	1	LS	1.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$41,014,000.00	\$41,014,000.00	\$41,014,000.00	0%	0%	\$41,014,000	A Previous Work	Assumes 1.6% of total capital costs per Lower Duwamish. See Calculations for derivation.																																																				
												TOTAL UNIT COST:		\$41,014,000																																																							
<b>Notes:</b> HTRW productivity factor is from Exhibit B-3 or B-4 of "A Guide to Developing and Documenting Cost Estimates During the Feasibility Study", EPA 2000 The Cost Database Code is a reference code for linking with line item cost information with the cost source database and is not otherwise used within these cost worksheets.																																																																					
<b>Source of Cost Data:</b> NA Not Applicable - costs are from previous work or vendor quote For citation references, the following sources apply: MII (MII Assemblies), GSA (www.gsa.gov), FLC (www.flcdatabase.com), A (Allowance), V (Vendor Quote), CW (Means CostWorks 2015), P (Previous Work), and FRTR (www.frtr.gov)																																																																					
<b>Cost Adjustment Checklist:</b> FACTOR: H&S Productivity (labor and equipment only) Escalation to Base Year Area Cost Factor Subcontractor Overhead and Profit Prime Contractor Overhead and Profit																																																																					
<b>NOTES:</b> Field work will be in Level "D" PPE. MII assembly costs include HPF adjustments. 2015 cost sources are not escalated (EF=1.00). All other costs are escalated based on the USACE CWCCIS, EM 1110-2-1304, Mar 2015. An AF of 1.05 is used for Oregon, except that an AF of 1.00 (national unmodified average) is used for MII assembly costs and local vendor quotes. It is assumed that home office OH is 8% and profit is 9% for the Prime Contractor. Professional labor overhead is 100%. Allowances and items with mandated costs such as per diem do not have overhead and profit applied. Items previously developed by Anchor QEA (2010) already include contractor markups, therefore overhead and profit were not applied to those items. It is assumed that OH is 1% and profit is 0% for vendor quotes for treatment and disposal at offsite disposal facilities. It is assumed that OH is 5% and profit is 0% for quotes for all other material vendor quotes.																																																																					
<b>Abbreviations:</b> <table style="width: 100%; border: none;"> <tr> <td style="width: 33%;">QTY</td> <td style="width: 33%;">Quantity</td> <td style="width: 33%;">ACR</td> <td style="width: 33%;">Acres</td> </tr> <tr> <td>EQUIP</td> <td>Equipment</td> <td>BCY</td> <td>Bank Cubic Yard</td> </tr> <tr> <td>MATL</td> <td>Material</td> <td>CLF</td> <td>100 Linear Foot</td> </tr> <tr> <td>HPF</td> <td>HTRW Productivity Factor</td> <td>DY</td> <td>Days</td> </tr> <tr> <td>ADJ LABOR</td> <td>Adjusted Labor for HPF</td> <td>EA</td> <td>Each</td> </tr> <tr> <td>ADJ EQUIP</td> <td>Adjusted Equipment for HPF</td> <td>LF</td> <td>Linear Foot</td> </tr> <tr> <td>UNMOD UC</td> <td>Unmodified Unit Cost</td> <td>HR</td> <td>Hours</td> </tr> <tr> <td>UNMOD LIC</td> <td>Unmodified Line Item Cost</td> <td>LB</td> <td>Pounds</td> </tr> <tr> <td>UNBUR LIC</td> <td>Unburdened Line Item Cost</td> <td>LCY</td> <td>Loose Cubic Yard</td> </tr> <tr> <td>PC OH</td> <td>Prime Contractor Overhead</td> <td>LS</td> <td>Lump Sum</td> </tr> <tr> <td>PC PF</td> <td>Prime Contractor Profit</td> <td>RL</td> <td>Roll</td> </tr> <tr> <td>BUR LIC</td> <td>Burdened Line Item Cost</td> <td>SY</td> <td>Square Yard</td> </tr> <tr> <td></td> <td></td> <td>TN</td> <td>Tons</td> </tr> </table>																		QTY	Quantity	ACR	Acres	EQUIP	Equipment	BCY	Bank Cubic Yard	MATL	Material	CLF	100 Linear Foot	HPF	HTRW Productivity Factor	DY	Days	ADJ LABOR	Adjusted Labor for HPF	EA	Each	ADJ EQUIP	Adjusted Equipment for HPF	LF	Linear Foot	UNMOD UC	Unmodified Unit Cost	HR	Hours	UNMOD LIC	Unmodified Line Item Cost	LB	Pounds	UNBUR LIC	Unburdened Line Item Cost	LCY	Loose Cubic Yard	PC OH	Prime Contractor Overhead	LS	Lump Sum	PC PF	Prime Contractor Profit	RL	Roll	BUR LIC	Burdened Line Item Cost	SY	Square Yard			TN	Tons
QTY	Quantity	ACR	Acres																																																																		
EQUIP	Equipment	BCY	Bank Cubic Yard																																																																		
MATL	Material	CLF	100 Linear Foot																																																																		
HPF	HTRW Productivity Factor	DY	Days																																																																		
ADJ LABOR	Adjusted Labor for HPF	EA	Each																																																																		
ADJ EQUIP	Adjusted Equipment for HPF	LF	Linear Foot																																																																		
UNMOD UC	Unmodified Unit Cost	HR	Hours																																																																		
UNMOD LIC	Unmodified Line Item Cost	LB	Pounds																																																																		
UNBUR LIC	Unburdened Line Item Cost	LCY	Loose Cubic Yard																																																																		
PC OH	Prime Contractor Overhead	LS	Lump Sum																																																																		
PC PF	Prime Contractor Profit	RL	Roll																																																																		
BUR LIC	Burdened Line Item Cost	SY	Square Yard																																																																		
		TN	Tons																																																																		

## TABLE CW-G2

**Alternative G**  
**Capital Cost Sub-Element**  
**Institutional Controls**

Cost Worksheet: CW-G2

**COST WORKSHEET**

**Site:** Portland Harbor Superfund Site  
**Location:** Portland, Oregon  
**Phase:** Draft Feasibility Study  
**Base Year:** 2015

Prepared By: JN Date: 7/27/2015

Checked By: AS Date: 7/28/2015

**Work Statement:**

This sub-element involves implementation of institutional controls for the site. The following cost includes labor and materials to develop legal documents for institutional controls and cost for document submission and recording.

**Cost Analysis:**

Cost for Institutional Controls (Lump Sum)

COST DATABASE CODE	DESCRIPTION	QTY	UNIT(S)	HPF	LABOR	ADJ LABOR	EQUIP	ADJ EQUIP	MATL	OTHER	UNMOD UC	UNMOD LIC	PC OH	PC PF	BUR LIC	COST SOURCE CITATION	COMMENTS
	<b>Informational Devices - Fish Consumption Advisory</b>																
L11	Project Manager	800	HR	1.00	\$82.17	\$82.17	\$0.00	\$0.00	\$0.00	\$0.00	\$82.17	\$65,736.00	100%	9%	\$143,304	FLC FLCDataCenter	
L4	Environmental Engineer	500	HR	1.00	\$48.91	\$48.91	\$0.00	\$0.00	\$0.00	\$0.00	\$48.91	\$24,455.00	100%	9%	\$53,312	FLC FLCDataCenter	
L6	Environmental Scientist	800	HR	1.00	\$37.70	\$37.70	\$0.00	\$0.00	\$0.00	\$0.00	\$37.70	\$30,160.00	100%	9%	\$65,749	FLC FLCDataCenter	
L3	Clerks, Typist, Bookkeeper & Receptionist	300	HR	1.00	\$19.89	\$19.89	\$0.00	\$0.00	\$0.00	\$0.00	\$19.89	\$5,967.00	100%	9%	\$13,008	FLC FLCDataCenter	
L5	Environmental Lawyer	150	HR	1.00	\$71.72	\$71.72	\$0.00	\$0.00	\$0.00	\$0.00	\$71.72	\$10,758.00	100%	9%	\$23,452	FLC FLCDataCenter	
L13	Paralegal	300	HR	1.00	\$29.56	\$29.56	\$0.00	\$0.00	\$0.00	\$0.00	\$29.56	\$8,868.00	100%	9%	\$19,332	FLC FLCDataCenter	
	<b>Informational Devices - Regulated Navigation Area (RNA) Setup</b>																
L11	Project Manager	150	HR	1.00	\$82.17	\$82.17	\$0.00	\$0.00	\$0.00	\$0.00	\$82.17	\$12,325.50	100%	9%	\$26,870	FLC FLCDataCenter	
L4	Environmental Engineer	100	HR	1.00	\$48.91	\$48.91	\$0.00	\$0.00	\$0.00	\$0.00	\$48.91	\$4,891.00	100%	9%	\$10,662	FLC FLCDataCenter	
L5	Environmental Lawyer	80	HR	2.00	\$71.72	\$35.86	\$0.00	\$0.00	\$0.00	\$0.00	\$35.86	\$2,868.80	100%	9%	\$6,254	FLC FLCDataCenter	
L13	Paralegal	160	HR	1.00	\$29.56	\$29.56	\$0.00	\$0.00	\$0.00	\$0.00	\$29.56	\$4,729.60	100%	9%	\$10,311	FLC FLCDataCenter	
A1	18' Boat	80	HR	1.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$28.02	\$28.02	\$2,241.60	8%	9%	\$2,639	MII MII Assembly	For buoy setup
L17	Boat Operator	80	HR	1.00	\$33.16	\$33.16	\$0.00	\$0.00	\$0.00	\$0.00	\$33.16	\$2,652.80	100%	9%	\$5,783	FLC FLCDataCenter	
L8	Field Technician	80	HR	1.00	\$31.42	\$31.42	\$0.00	\$0.00	\$0.00	\$0.00	\$31.42	\$2,513.60	100%	9%	\$5,480	FLC FLCDataCenter	
M21	Buoy	120	EA	1.00	\$0.00	\$0.00	\$0.00	\$0.00	\$421.76	\$0.00	\$421.76	\$50,611.20	5%	0%	\$53,142	V Vendor Quote	Quote - Go2Marine
	<b>Proprietary Controls</b>																
L5	Environmental Lawyer	200	HR	1.00	\$71.72	\$71.72	\$0.00	\$0.00	\$0.00	\$0.00	\$71.72	\$14,344.00	100%	9%	\$31,270	FLC FLCDataCenter	
L13	Paralegal	250	HR	1.00	\$29.56	\$29.56	\$0.00	\$0.00	\$0.00	\$0.00	\$29.56	\$7,390.00	100%	9%	\$16,110	FLC FLCDataCenter	
L3	Clerks, Typist, Bookkeeper & Receptionist	150	HR	1.00	\$19.89	\$19.89	\$0.00	\$0.00	\$0.00	\$0.00	\$19.89	\$2,983.50	100%	9%	\$6,504	FLC FLCDataCenter	
	<b>Enforcement Tools</b>																
L5	Environmental Lawyer	4,200	HR	1.00	\$71.72	\$71.72	\$0.00	\$0.00	\$0.00	\$0.00	\$71.72	\$301,224.00	100%	9%	\$656,668	FLC FLCDataCenter	
L13	Paralegal	5,250	HR	1.00	\$29.56	\$29.56	\$0.00	\$0.00	\$0.00	\$0.00	\$29.56	\$155,190.00	100%	9%	\$338,314	FLC FLCDataCenter	
L3	Clerks, Typist, Bookkeeper & Receptionist	2,100	HR	1.00	\$19.89	\$19.89	\$0.00	\$0.00	\$0.00	\$0.00	\$19.89	\$41,769.00	100%	9%	\$91,056	FLC FLCDataCenter	
<b>TOTAL UNIT COST:</b>															<b>\$1,579,220</b>		

**Notes:**

HTRW productivity factor is from Exhibit B-3 or B-4 of "A Guide to Developing and Documenting Cost Estimates During the Feasibility Study", EPA 2000  
The Cost Database Code is a reference code for linking with line item cost information with the cost source database and is not otherwise used within these cost worksheets.

**Source of Cost Data:**

NA Not Applicable - costs are from previous work or vendor quote

For citation references, the following sources apply:

MII (MII Assemblies), GSA (www.gsa.gov), FLC (www.flcdatacenter.com), A (Allowance), V (Vendor Quote), CW (Means CostWorks 2015), P (Previous Work), and FRTR (www.frtr.gov)

**Cost Adjustment Checklist:****FACTOR:**

H&amp;S Productivity (labor and equipment only)

Escalation to Base Year

Area Cost Factor

Subcontractor Overhead and Profit

Prime Contractor Overhead and Profit

**NOTES:**

Field work will be in Level "D" PPE.

MII assembly costs include HPF adjustments.

2015 cost sources are not escalated (EF=1.00). All other costs are escalated based on the USACE WCWCIS, EM 1110-2-1304, Mar 2015.

An AF of 1.05 is used for Oregon, except that an AF of 1.00 (national unmodified average) is used for MII assembly costs and local vendor quotes.

It is assumed that home office OH is 8% and profit is 9% for the Prime Contractor. Professional labor overhead is 100%. Allowances and items with mandated costs such as per diem do not have overhead and profit applied.

Items previously developed by Anchor QEA (2010) already include contractor markups, therefore overhead and profit were not applied to those items.

It is assumed that OH is 1% and profit is 0% for vendor quotes for treatment and disposal at offsite disposal facilities. It is assumed that OH is 5% and profit is 0% for quotes for all other material vendor quotes.

**Abbreviations:**

QTY	Quantity	ACR	Acres
EQUIP	Equipment	BCY	Bank Cubic Yard
MATL	Material	CLF	100 Linear Foot
HPF	HTRW Productivity Factor	DY	Days
ADJ LABOR	Adjusted Labor for HPF	EA	Each
ADJ EQUIP	Adjusted Equipment for HPF	LF	Linear Foot
	Unmodified Unit Cost	HR	Hours
UNMOD LIC	Unmodified Line Item Cost	LB	Pounds
UNBUR LIC	Unburdened Line Item Cost	LCY	Loose Cubic Yard
PC OH	Prime Contractor Overhead	LS	Lump Sum
PC PF	Prime Contractor Profit	RL	Roll
BUR LIC	Burdened Line Item Cost	SY	Square Yard
		TN	Tons

## TABLE CW-G3

Alternative G	Cost Worksheet: CW-G3	
---------------	-----------------------	--

## COST WORKSHEET

<b>Site:</b>	Portland Harbor Superfund Site	<b>Prepared By:</b>	JN	<b>Date:</b>	7/27/2015
<b>Location:</b>	Portland, Oregon				
<b>Phase:</b>	Draft Feasibility Study	<b>Checked By:</b>	AS	<b>Date:</b>	7/28/2015
<b>Base Year:</b>	2015				

Work Statement:

This sub-element involves evaluating and updating of institutional controls for the site. The following cost includes labor and materials to required for evaluating and updating institutional controls every 5 years.

**Cost Analysis:**

Cost for Evaluating and Updating Institutional Controls (Lump Sum)

COST DATABASE CODE	DESCRIPTION	QTY	UNIT(S)	HPF	LABOR	ADJ LABOR	EQUIP	ADJ EQUIP	MATL	OTHER	UNMOD UC	UNMOD LIC	PC OH	PC PF	BUR LIC	COST SOURCE CITATION	COMMENTS
	Informational Devices - Fish Consumption Advisory																
L11	Project Manager	80	HR	1.00	\$82.17	\$82.17	\$0.00	\$0.00	\$0.00	\$0.00	\$82.17	\$6,573.60	100%	9%	\$14,330	FLC FLCDataCenter	Assumes 10% of initial costs for updating periodically
L4	Environmental Engineer	50	HR	1.00	\$48.91	\$48.91	\$0.00	\$0.00	\$0.00	\$0.00	\$48.91	\$2,445.50	100%	9%	\$5,331	FLC FLCDataCenter	Assumes 10% of initial costs for updating periodically
L6	Environmental Scientist	80	HR	1.00	\$37.70	\$37.70	\$0.00	\$0.00	\$0.00	\$0.00	\$37.70	\$3,016.00	100%	9%	\$6,575	FLC FLCDataCenter	Assumes 10% of initial costs for updating periodically
L3	Clerks, Typist, Bookkeeper & Receptionist	30	HR	1.00	\$19.89	\$19.89	\$0.00	\$0.00	\$0.00	\$0.00	\$19.89	\$596.70	100%	9%	\$1,301	FLC FLCDataCenter	Assumes 10% of initial costs for updating periodically
L5	Environmental Lawyer	15	HR	1.00	\$71.72	\$71.72	\$0.00	\$0.00	\$0.00	\$0.00	\$71.72	\$1,075.80	100%	9%	\$2,345	FLC FLCDataCenter	Assumes 10% of initial costs for updating periodically
L13	Paralegal	30	HR	1.00	\$29.56	\$29.56	\$0.00	\$0.00	\$0.00	\$0.00	\$29.56	\$886.80	100%	9%	\$1,933	FLC FLCDataCenter	Assumes 10% of initial costs for updating periodically
	Informational Devices - Regulated Navigation Area (RNA) Setup																
L11	Project Manager	15	HR	1.00	\$82.17	\$82.17	\$0.00	\$0.00	\$0.00	\$0.00	\$82.17	\$1,232.55	100%	9%	\$2,687	FLC FLCDataCenter	Assumes 10% of initial costs for updating periodically
L4	Environmental Engineer	10	HR	1.00	\$48.91	\$48.91	\$0.00	\$0.00	\$0.00	\$0.00	\$48.91	\$489.10	100%	9%	\$1,066	FLC FLCDataCenter	Assumes 10% of initial costs for updating periodically
L5	Environmental Lawyer	8	HR	2.00	\$71.72	\$35.86	\$0.00	\$0.00	\$0.00	\$0.00	\$35.86	\$286.88	100%	9%	\$625	FLC FLCDataCenter	Assumes 10% of initial costs for updating periodically
L13	Paralegal	16	HR	1.00	\$29.56	\$29.56	\$0.00	\$0.00	\$0.00	\$0.00	\$29.56	\$472.96	100%	9%	\$1,031	FLC FLCDataCenter	Assumes 10% of initial costs for updating periodically
A1	18' Boat	80	HR	1.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$28.02	\$28.02	\$2,241.60	8%	9%	\$2,639	MII MII Assembly	For buoy setup
L17	Boat Operator	80	HR	1.00	\$33.16	\$33.16	\$0.00	\$0.00	\$0.00	\$0.00	\$33.16	\$2,652.80	100%	9%	\$5,783	FLC FLCDataCenter	
L8	Field Technician	80	HR	1.00	\$31.42	\$31.42	\$0.00	\$0.00	\$0.00	\$0.00	\$31.42	\$2,513.60	100%	9%	\$5,480	FLC FLCDataCenter	
M21	Buoy	120	EA	1.00	\$0.00	\$0.00	\$0.00	\$0.00	\$421.76	\$0.00	\$421.76	\$50,611.20	5%	0%	\$53,142	V Vendor Quote	Quote - Go2Marine
	Proprietary Controls																
L5	Environmental Lawyer	20	HR	1.00	\$71.72	\$71.72	\$0.00	\$0.00	\$0.00	\$0.00	\$71.72	\$1,434.40	100%	9%	\$3,127	FLC FLCDataCenter	Assumes 10% of initial costs for updating periodically
L13	Paralegal	25	HR	1.00	\$29.56	\$29.56	\$0.00	\$0.00	\$0.00	\$0.00	\$29.56	\$739.00	100%	9%	\$1,611	FLC FLCDataCenter	Assumes 10% of initial costs for updating periodically
L3	Clerks, Typist, Bookkeeper & Receptionist	15	HR	1.00	\$19.89	\$19.89	\$0.00	\$0.00	\$0.00	\$0.00	\$19.89	\$298.35	100%	9%	\$650	FLC FLCDataCenter	Assumes 10% of initial costs for updating periodically
	Enforcement Tools																
L5	Environmental Lawyer	420	HR	1.00	\$71.72	\$71.72	\$0.00	\$0.00	\$0.00	\$0.00	\$71.72	\$30,122.40	100%	9%	\$65,667	FLC FLCDataCenter	Assumes 10% of initial costs for updating periodically
L13	Paralegal	525	HR	1.00	\$29.56	\$29.56	\$0.00	\$0.00	\$0.00	\$0.00	\$29.56	\$15,519.00	100%	9%	\$33,831	FLC FLCDataCenter	Assumes 10% of initial costs for updating periodically
L3	Clerks, Typist, Bookkeeper & Receptionist	210	HR	1.00	\$19.89	\$19.89	\$0.00	\$0.00	\$0.00	\$0.00	\$19.89	\$4,176.90	100%	9%	\$9,106	FLC FLCDataCenter	Assumes 10% of initial costs for updating periodically
												TOTAL UNIT COST:		\$218,260			

Notes: \_\_\_\_\_ Abbreviations: \_\_\_\_\_

HTRW productivity factor is from Exhibit B-3 or B-4 of "A Guide to Developing and Documenting Cost Estimates During the Feasibility Study", EPA 2000		QTY	Quantity	ACR	Acres
--	--	-----	----------	-----	-------

The Cost Database Code is a reference code for linking with line item cost information with the cost source database and is not otherwise used within these cost worksheets.

Source of Cost Data:		HPF	HTRW Productivity Factor	DY	Days
----------------------	--	-----	--------------------------	----	------

NA	Not Applicable - costs are from previous work or vendor quote	ADJ LABOR	Adjusted Labor for HFP	EA	Each
----	---	-----------	------------------------	----	------

For citation references, the following sources apply:

MII (MII Assemblies), GSA ( <a href="http://www.gsa.gov">www.gsa.gov</a> ), FLC ( <a href="http://www.flcdatcenter.com">www.flcdatcenter.com</a> ), A (Allowance), V (Vendor Quote), CW (Means CostWorks 2015), P (Previous Work), and FRTR ( <a href="http://www.frtr.gov">www.frtr.gov</a> )		Unmodified Unit Cost	HR	Hours
--	--	----------------------	----	-------

Cost Adjustment Checklist:	NOTES:	UNBUR LIC	Unburdened Line Item Cost	LCY	Loose Cubic Yard
----------------------------	--------	-----------	---------------------------	-----	------------------

FACTOR:	Field work will be in Level "D" PPE.	PC OH	Prime Contractor Overhead	LS	Lump Sum
---------	--------------------------------------	-------	---------------------------	----	----------

H&S Productivity (labor and equipment only)	MII assembly costs include HPF adjustments.	PC PF	Prime Contractor Profit	RL	Roll
---	---	-------	-------------------------	----	------

Escalation to Base Year	2015 cost sources are not escalated (EF=1.00). All other costs are escalated based on the USACE CWWCIS, EM 1110-2-1304, Mar 2015.	BUR LIC	Burdened Line Item Cost	SY	Square Yard
-------------------------	---	---------	-------------------------	----	-------------

Area Cost Factor	An AF of 1.05 is used for Oregon, except that an AF of 1.00 (national unmodified average) is used for MII assembly costs and local vendor quotes.	TN	Tons
------------------	---	----	------

Subcontractor Overhead and Profit It is assumed that home office OH is 8% and profit is 9% for the Prime Contractor. Professional labor overhead is 100%. Allowances and items with mandated costs such as per diem do not have overhead and profit applied.

Prime Contractor Overhead and Profit

NOTES:	UNBUR LIC	Unburdened Line Item Cost	LCY	Loose Cubic Yard
--------	-----------	---------------------------	-----	------------------

Field work will be in Level "D" PPE.	PC OH	Prime Contractor Overhead	LS	Lump Sum
--------------------------------------	-------	---------------------------	----	----------

MII assembly costs include HPF adjustments.

2015 cost sources are not escalated (EF=1.00). All other costs are escalated based on the USACE CWCCIS, EM 1110-2-1304, Mar 2015.

An AF of 1.05 is used for Oregon, except that an AF of 1.00 (national unmodified average) is used for MII assembly costs and local vendor quotes.

It is assumed that home office OH is 8% and profit is 9% for the Prime Contractor. Professional labor overhead is 100%. Allowances and items with mandated costs such as per diem do not have overhead and profit applied.

Items previously developed by Anchor QEA (2010) already include contractor markups, therefore overhead and profit were not applied to those items.

It is assumed that OH is 1% and profit is 0% for vendor quotes for treatment and disposal at offsite disposal facilities. It is assumed that OH is 5% and profit is 0% for quotes for all other material vendor quotes.

**Abbreviations:**

QTY	Quantity	ACR	Acres
EQUIP	Equipment	BCY	Bank Cubic Yard
MATL	Material	CLF	100 Linear Foot
HPF	HTRW Productivity Factor	DY	Days
ADJ LABOR	Adjusted Labor for HFP	EA	Each
ADJ EQUIP	Adjusted Equipment for HFP	LF	Linear Foot
	Unmodified Unit Cost	HR	Hours
UNMOD LIC	Unmodified Line Item Cost	LB	Pounds
UNBUR LIC	Unburdened Line Item Cost	LCY	Loose Cubic Yard
PC OH	Prime Contractor Overhead	LS	Lump Sum
PC PF	Prime Contractor Profit	RL	Roll
BUR LIC	Burdened Line Item Cost	SY	Square Yard
		TN	Tons

TABLE CW-G5

<div style="display: flex; justify-content: space-between;"> <span><b>Alternative G</b></span> <span><b>Cost Worksheet: CW-G5</b></span> </div> <div style="display: flex; justify-content: space-between; margin-top: 5px;"> <span><b>Capital Cost Sub-Element</b></span> <span><b>COST WORKSHEET</b></span> </div> <div style="display: flex; justify-content: space-between; margin-top: 5px;"> <span><b>Debris Removal and Disposal</b></span> </div>																	
<b>Site:</b> Portland Harbor Superfund Site <b>Location:</b> Portland, Oregon <b>Phase:</b> Draft Feasibility Study <b>Base Year:</b> 2015												<b>Prepared By:</b> JN  <b>Checked By:</b> AS		<b>Date:</b> 7/27/2015  <b>Date:</b> 7/28/2015			
<b>Work Statement:</b> This sub-element involves removal and disposal of debris for all areas prior to remedial activities. It includes costs for on-site labor, equipment, and materials developed from previous work.																	
<b>Cost Analysis:</b> Cost for Debris Removal and Disposal (Lump Sum)																	
COST DATABASE CODE	DESCRIPTION	QTY	UNIT(S)	HPF	LABOR	ADJ LABOR	EQUIP	ADJ EQUIP	MATL	OTHER	UNMOD UC	UNMOD LIC	PC OH	PC PF	BUR LIC	COST SOURCE CITATION	COMMENTS
P9	Debris Removal and Disposal	795.1	AC	1.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$13,083.75	\$13,083.75	\$10,402,602.48	0%	0%	\$10,402,602	P Previous Work	Developed by Anchor QEA (2010)
TOTAL UNIT COST:															\$10,402,602		
<div style="display: flex; justify-content: space-between;"> <div style="width: 60%;"> <b>Notes:</b>            HTRW productivity factor is from Exhibit B-3 or B-4 of "A Guide to Developing and Documenting Cost Estimates During the Feasibility Study", EPA 2000            The Cost Database Code is a reference code for linking with line item cost information with the cost source database and is not otherwise used within these cost worksheets.         </div> <div style="width: 35%;"> <b>Abbreviations:</b>            QTY Quantity ACR Acres            EQUIP Equipment BCY Bank Cubic Yard            MATL Material CLF 100 Linear Foot            HPF HTRW Productivity Factor DY Days            ADJ LABOR Adjusted Labor for HFP EA Each            ADJ EQUIP Adjusted Equipment for HFP LF Linear Foot            UNMOD UC Unmodified Unit Cost HR Hours            UNMOD LIC Unmodified Line Item Cost LB Pounds            UNBUR LIC Unburdened Line Item Cost LCY Loose Cubic Yard            PC OH Prime Contractor Overhead LS Lump Sum            PC PF Prime Contractor Profit RL Roll            BUR LIC Burdened Line Item Cost SY Square Yard            TN Tons         </div> </div>																	
<div style="display: flex; justify-content: space-between;"> <div style="width: 45%;"> <b>Source of Cost Data:</b>            NA Not Applicable - costs are from previous work or vendor quote            For citation references, the following sources apply:            MII (MII Assemblies), GSA (www.gsa.gov), FLC (www.flcdatcenter.com), A (Allowance), V (Vendor Quote), CW (Means CostWorks 2015), P (Previous Work), and FRTR (www.frtr.gov)         </div> <div style="width: 50%;"> <b>Cost Adjustment Checklist:</b>            FACTOR: Field work will be in Level "D" PPE.            H&amp;S Productivity (labor and equipment only) MII assembly costs include HPF adjustments.            Escalation to Base Year 2015 cost sources are not escalated (EF=1.00). All other costs are escalated based on the USACE CWCCIS, EM 1110-2-1304, Mar 2015.            Area Cost Factor An AF of 1.05 is used for Oregon, except that an AF of 1.00 (national unmodified average) is used for MII assembly costs and local vendor quotes.            Subcontractor Overhead and Profit It is assumed that home office OH is 8% and profit is 9% for the Prime Contractor. Professional labor overhead is 100%. Allowances and items with mandated costs such as per diem do not have overhead and profit applied.            Prime Contractor Overhead and Profit Items previously developed by Anchor QEA (2010) already include contractor markups, therefore overhead and profit were not applied to those items.            It is assumed that OH is 1% and profit is 0% for vendor quotes for treatment and disposal at offsite disposal facilities. It is assumed that OH is 5% and profit is 0% for quotes for all other material vendor quotes.         </div> </div>																	



TABLE CW-G6

Alternative G	Cost Worksheet:	CW-G6
---------------	-----------------	-------

## COST WORKSHEET

<b>Site:</b>	Portland Harbor Superfund Site	<b>Prepared By:</b> JN	<b>Date:</b> 7/27/2015
<b>Location:</b>	Portland, Oregon		
<b>Phase:</b>	Draft Feasibility Study	<b>Checked By:</b> AS	<b>Date:</b> 7/28/2015
<b>Base Year:</b>	2015		

Work Statement:

This sub-element involves all work related to obstructions removal, relocation, and disposal. It includes all costs for labor, equipment and materials developed from previous work for pile removal and disposal, pile replacement, and temporary dock relocation.

Cost for Obstructions (Lump Sum)	
----------------------------------	--

COST DATABASE CODE	DESCRIPTION	QTY	UNIT(S)	HPF	LABOR	ADJ LABOR	EQUIP	ADJ EQUIP	MATL	OTHER	UNMOD UC	UNMOD LIC	PC OH	PC PF	BUR LIC	COST SOURCE CITATION	COMMENTS
P10	Pile Removal and Disposal	2,710	EA	1.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$714.38	\$714.38	\$1,935,956.25	0%	0%	\$1,935,956	P Previous Work	Developed by Anchor QEA (2010)
P11	Pile Replacement	2,710	EA	1.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$7,465.50	\$7,465.50	\$20,231,505.00	0%	0%	\$20,231,505	P Previous Work	Developed by Anchor QEA (2010)
P12	Temporary Dock Relocation	12	EA	1.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$100,319.63	\$100,319.63	\$1,203,835.50	0%	0%	\$1,203,836	P Previous Work	Developed by Anchor QEA (2010)
												TOTAL UNIT COST:		\$23,371,297			

Notes: \_\_\_\_\_ Abbreviations: \_\_\_\_\_

HTRW productivity factor is from Exhibit B-3 or B-4 of "A Guide to Developing and Documenting Cost Estimates During the Feasibility Study", EPA 2000	QTY	Quantity	ACR	Acre
--	-----	----------	-----	------

The Cost Database Code is a reference code for linking with line item cost information with the cost source database and is not otherwise used within these cost worksheets.

<b>Source of Cost Data:</b>	HPF	HTRW Productivity Factor	DY	Days
-----------------------------	-----	--------------------------	----	------

NA	Not Applicable - costs are from previous work or vendor quote	ADJ LABOR	Adjusted Labor for HFP	EA	Each
----	---	-----------	------------------------	----	------

For citation references, the following sources apply:

MII (MII Assemblies), GSA ( <a href="http://www.gsa.gov">www.gsa.gov</a> ), FLC ( <a href="http://www.flcdatcenter.com">www.flcdatcenter.com</a> ), A (Allowance), V (Vendor Quote), CW (Means CostWorks 2015), P (Previous Work), and FRTR ( <a href="http://www.frtr.gov">www.frtr.gov</a> )										UNMOD UC	Unmodified Unit Cost	HR	Hours
--	--	--	--	--	--	--	--	--	--	----------	----------------------	----	-------

<u>Cost Adjustment Checklist:</u>	<u>NOTES:</u>	UNBUR LIC	Unburdened Line Item Cost	LCY	Loose Cubic Yard
-----------------------------------	---------------	-----------	---------------------------	-----	------------------

Field work will be in Level "D" PPE.	PC OH	Prime Contractor Overhead	LS	Lump Sum
--------------------------------------	-------	---------------------------	----	----------

MII assembly costs include HPF adjustments.	PC PF	Prime Contractor Profit	RL	Roll
---	-------	-------------------------	----	------

2015 cost sources are not escalated (EF=1.00). All other costs are escalated based on the USACE CWCCIS, EM 1110-2-1304, Mar 2015.

An AF of 1.05 is used for Oregon, except that an AF of 1.00 (national unmodified average) is used for MII assembly costs and local vendor quotes.

It is assumed that home office OH is 8% and profit is 9% for the Prime Contractor. Professional labor overhead is 100%. Allowances and items with mandated costs such as per diem do not have overhead and profit applied.

Items previously developed by Anchor QEA (2010) already include contractor markups, therefore overhead and profit were not applied to those items.

It is assumed that OH is 1% and profit is 0% for vendor quotes for treatment and disposal at offsite disposal facilities. It is assumed that OH is 5% and profit is 0% for quotes for all other material vendor quotes.

Notes: \_\_\_\_\_ Abbreviations: \_\_\_\_\_

HTRW productivity factor is from Exhibit B-3 or B-4 of "A Guide to Developing and Documenting Cost Estimates During the Feasibility Study", EPA 2000		QTY	Quantity	ACR	Acres
The Cost Database Code is a reference code for linking with line item cost information with the cost source database and is not otherwise used within these cost worksheets.		EQUIP	Equipment	BCY	Bank Cubic Yard
		MATL	Material	CLF	100 Linear Foot
		HPF	HTRW Productivity Factor	DY	Days
		ADJ LABOR	Adjusted Labor for HFP	EA	Each
		ADJ EQUIP	Adjusted Equipment for HFP	LF	Linear Foot
		UNMOD UC	Unmodified Unit Cost	HR	Hours
		UNMOD LIC	Unmodified Line Item Cost	LB	Pounds
		UNBUR LIC	Unburdened Line Item Cost	LCY	Loose Cubic Yard
		PC OH	Prime Contractor Overhead	LS	Lump Sum
		PC PF	Prime Contractor Profit	RL	Roll
		BUR LIC	Burdened Line Item Cost	SY	Square Yard

<b><u>Source of Cost Data:</u></b>	
NA	Not Applicable - costs are from previous work or vendor quote
For citation references, the following sources apply:	
MII	(MII Assemblies), GSA ( <a href="http://www.gsa.gov">www.gsa.gov</a> ), FLC ( <a href="http://www.flcdatabase.com">www.flcdatabase.com</a> ), A (Allowance), V (Vendor Quote), CW (Means CostWorks 2015), P (Previous Work), and FRTR ( <a href="http://www.frtr.gov">www.frtr.gov</a> )

<b><u>Cost Adjustment Checklist:</u></b>	
FACTOR:	<b><u>NOTES:</u></b>
	Field work will be in Level "D" PPE.
H&S Productivity (labor and equipment only)	MII assembly costs include HPF adjustments.
Escalation to Base Year	2015 cost sources are not escalated (EF=1.00). All other costs are escalated based on the USACE CWCCIS, EM 1110-2-1304, Mar 2015.

TABLE CW-G7

<div style="display: flex; justify-content: space-between;"> <span><b>Alternative G</b></span> <span><b>Cost Worksheet: CW-G7</b></span> </div>																			
<b>Capital Cost Sub-Element</b> <b>Erosion/Residual Control Measures</b>												<b>COST WORKSHEET</b>							
<b>Site:</b> Portland Harbor Superfund Site <b>Location:</b> Portland, Oregon <b>Phase:</b> Draft Feasibility Study <b>Base Year:</b> 2015												<b>Prepared By:</b> JN		<b>Date:</b> 7/27/2015					
												<b>Checked By:</b> AS		<b>Date:</b> 7/28/2015					
<b>Work Statement:</b> This sub-element involves the installation, maintenance, and removal of silt curtains and sheet pile walls for erosion and residual control. It includes costs for on-site labor, equipment, and materials developed from previous work.																			
<b>Cost Analysis:</b> Cost for Erosion/Residual Control Measures (Lump Sum)																			
COST DATABASE CODE	DESCRIPTION	QTY	UNIT(S)	HPF	LABOR	ADJ LABOR	EQUIP	ADJ EQUIP	MATL	OTHER	UNMOD UC	UNMOD LIC	PC OH	PC PF	BUR LIC	COST SOURCE CITATION	COMMENTS		
P13	Purchase, Install and Maintain Silt Curtains	78,000	LF	1.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$96.75	\$96.75	\$7,546,500.00	0%	0%	\$7,546,500	P Previous Work	Developed by Anchor QEA (2010)		
P14	Purchase, Install and Remove Sheet Pile Walls	7,500	LF	1.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$2,745.00	\$2,745.00	\$20,587,500.00	0%	0%	\$20,587,500	P Previous Work	Developed by Anchor QEA (2010)		
TOTAL UNIT COST:															\$28,134,000				
<div style="display: flex; justify-content: space-between;"> <div style="width: 60%;"> <b>Notes:</b>            HTRW productivity factor is from Exhibit B-3 or B-4 of "A Guide to Developing and Documenting Cost Estimates During the Feasibility Study", EPA 2000            The Cost Database Code is a reference code for linking with line item cost information with the cost source database and is not otherwise used within these cost worksheets.   <b>Source of Cost Data:</b>            NA Not Applicable - costs are from previous work or vendor quote            For citation references, the following sources apply:            MII (MII Assemblies), GSA (www.gsa.gov), FLC (www.flcdatcenter.com), A (Allowance), V (Vendor Quote), CW (Means CostWorks 2015), P (Previous Work), and FRTR (www.frtr.gov)         </div> <div style="width: 35%;"> <b>Abbreviations:</b>            QTY Quantity            EQUIP Equipment            MATL Material            HPF HTRW Productivity Factor            ADJ LABOR Adjusted Labor for HFP            ADJ EQUIP Adjusted Equipment for HFP            UNMOD UC Unmodified Unit Cost            UNMOD LIC Unmodified Line Item Cost            UNBUR LIC Unburdened Line Item Cost            PC OH Prime Contractor Overhead            PC PF Prime Contractor Profit            BUR LIC Burdened Line Item Cost         </div> <div style="width: 40%;">           ACR Acres            BCY Bank Cubic Yard            CLF 100 Linear Foot            DY Days            EA Each            LF Linear Foot            HR Hours            LB Pounds            LCY Loose Cubic Yard            LS Lump Sum            RL Roll            SY Square Yard            TN Tons         </div> </div>																			
<div style="display: flex; justify-content: space-between;"> <div style="width: 45%;"> <b>Cost Adjustment Checklist:</b>            FACTOR:            H&amp;S Productivity (labor and equipment only)            Escalation to Base Year            Area Cost Factor            Subcontractor Overhead and Profit            Prime Contractor Overhead and Profit         </div> <div style="width: 50%;"> <b>NOTES:</b>            Field work will be in Level "D" PPE.            MII assembly costs include HPF adjustments.            2015 cost sources are not escalated (EF=1.00). All other costs are escalated based on the USACE CWCCIS, EM 1110-2-1304, Mar 2015.            An AF of 1.05 is used for Oregon, except that an AF of 1.00 (national unmodified average) is used for MII assembly costs and local vendor quotes.            It is assumed that home office OH is 8% and profit is 9% for the Prime Contractor. Professional labor overhead is 100%. Allowances and items with mandated costs such as per diem do not have overhead and profit applied.            Items previously developed by Anchor QEA (2010) already include contractor markups, therefore overhead and profit were not applied to those items.            It is assumed that OH is 1% and profit is 0% for vendor quotes for treatment and disposal at offsite disposal facilities. It is assumed that OH is 5% and profit is 0% for quotes for all other material vendor quotes.         </div> </div>																			

TABLE CW-G8

TABLE CW-G8																				
<div style="display: flex; justify-content: space-between;"> <div> <b>Alternative G</b>  <b>Capital Cost Sub-Element</b>  <b>Dredging of Contaminated Sediments (Open Water)</b> </div> <div> <b>Cost Worksheet: CW-G8</b> </div> <div style="text-align: right;"> <b>COST WORKSHEET</b> </div> </div>																				
<b>Site:</b> Portland Harbor Superfund Site <b>Location:</b> Portland, Oregon <b>Phase:</b> Draft Feasibility Study <b>Base Year:</b> 2015										<b>Prepared By:</b> JN <b>Checked By:</b> AS <b>Date:</b> 7/27/2015 <b>Date:</b> 7/28/2015										
<b>Work Statement:</b> This sub-element involves mechanical dredging of contaminated sediments in open water areas and transport to offloading area. It includes costs for on-site labor, equipment, and materials developed from previous work.																				
<b>Cost Analysis:</b> Cost for Open Water Dredging (Lump Sum)																				
COST DATABASE CODE	DESCRIPTION	QTY	UNIT(S)	HPF	LABOR	ADJ LABOR	EQUIP	ADJ EQUIP	MATL	OTHER	UNMOD UC	UNMOD LIC	PC OH	PC PF	BUR LIC	COST SOURCE CITATION	COMMENTS			
P15	Open Water Dredging and Transport	7,295,277	CY	1.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$38.03	\$38.03	\$277,402,907.93	0%	0%	\$277,402,908	P	Previous Work Developed by Anchor QEA (2010)			
												TOTAL UNIT COST:		\$277,402,908						
<b>Notes:</b> HTRW productivity factor is from Exhibit B-3 or B-4 of "A Guide to Developing and Documenting Cost Estimates During the Feasibility Study", EPA 2000 The Cost Database Code is a reference code for linking with line item cost information with the cost source database and is not otherwise used within these cost worksheets.															<b>Abbreviations:</b> QTY Quantity EQUIP Equipment MATL Material HPF HTRW Productivity Factor ADJ LABOR Adjusted Labor for HFP ADJ EQUIP Adjusted Equipment for HFP UNMOD UC Unmodified Unit Cost UNMOD LIC Unmodified Line Item Cost UNBUR LIC Unburdened Line Item Cost PC OH Prime Contractor Overhead PC PF Prime Contractor Profit BUR LIC Burdened Line Item Cost			ACR Acres BCY Bank Cubic Yard CLF 100 Linear Foot DY Days EA Each LF Linear Foot HR Hours LB Pounds LCY Loose Cubic Yard LS Lump Sum RL Roll SY Square Yard TN Tons		
<b>Source of Cost Data:</b> NA Not Applicable - costs are from previous work or vendor quote For citation references, the following sources apply: MII (MII Assemblies), GSA (www.gsa.gov), FLC (www.flcdatabase.com), A (Allowance), V (Vendor Quote), CW (Means CostWorks 2015), P (Previous Work), and FRTR (www.frtr.gov)															<b>Cost Adjustment Checklist:</b> FACTOR: H&S Productivity (labor and equipment only) Escalation to Base Year Area Cost Factor Subcontractor Overhead and Profit Prime Contractor Overhead and Profit			<b>NOTES:</b> Field work will be in Level "D" PPE. MII assembly costs include HPF adjustments. 2015 cost sources are not escalated (EF=1.00). All other costs are escalated based on the USACE CWCCIS, EM 1110-2-1304, Mar 2015. An AF of 1.05 is used for Oregon, except that an AF of 1.00 (national unmodified average) is used for MII assembly costs and local vendor quotes. It is assumed that home office OH is 8% and profit is 9% for the Prime Contractor. Professional labor overhead is 100%. Allowances and items with mandated costs such as per diem do not have overhead and profit applied. Items previously developed by Anchor QEA (2010) already include contractor markups, therefore overhead and profit were not applied to those items. It is assumed that OH is 1% and profit is 0% for vendor quotes for treatment and disposal at offsite disposal facilities. It is assumed that OH is 5% and profit is 0% for quotes for all other material vendor quotes.		

TABLE CW-G9

Alternative G	Cost Worksheet:	CW-G9
---------------	-----------------	-------

Capital Cost Sub-Element Dredging of Contaminated Sediments (Confined)	<b>COST WORKSHEET</b>
---	-----------------------

<b>Site:</b>	Portland Harbor Superfund Site	<b>Prepared By:</b> JN	<b>Date:</b> 7/27/2015
<b>Location:</b>	Portland, Oregon		
<b>Phase:</b>	Draft Feasibility Study	<b>Checked By:</b> AS	<b>Date:</b> 7/28/2015
<b>Base Year:</b>	2015		

This sub-element involves mechanical dredging of contaminated sediments in confined areas and transport to offloading area. It includes costs for on-site labor, equipment, and materials developed from previous work.

Cost for Confined Dredging (Lump Sum)	
---------------------------------------	--

COST DATABASE CODE	DESCRIPTION	QTY	UNIT(S)	HPF	LABOR	ADJ LABOR	EQUIP	ADJ EQUIP	MATL	OTHER	UNMOD UC	UNMOD LIC	PC OH	PC PF	BUR LIC	COST SOURCE CITATION	COMMENTS
P16	Confined Dredging and Transport	714,179	CY	1.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$53.66	\$53.66	\$38,324,630.59	0%	0%	\$38,324,631	P Previous Work	Developed by Anchor QTEA (2010)
												TOTAL UNIT COST:			\$38,324,631		

Notes: \_\_\_\_\_ Abbreviations: \_\_\_\_\_

QTY	Quantity	ACR	Acres
EQUIP	Equipment	BCY	Bank Cubic Yard

<b>Source of Cost Data:</b>	HPF	HTRW Productivity Factor	DY	Days
-----------------------------	-----	--------------------------	----	------

NA	Not Applicable - costs are from previous work or vendor quote	ADJ LABOR	Adjusted Labor for HFP	EA	Each
For citation references, the following sources apply:		ADJ EQUIP	Adjusted Equipment for HFP	LF	Linear Foot
MII (Mil Assemblies), GSA (www.gsa.gov), FLC (www.flcdatcenter.com), A (Allowance), V (Vendor Quote), CW (Means CostWorks 2015), P (Previous Work), and FRTR (www.frtr.gov)		UNMOD UC	Unmodified Unit Cost	HR	Hours

<b><u>Cost Adjustment Checklist:</u></b>	<b><u>NOTES:</u></b>	UNBUR LIC	Unburdened Line Item Cost	LCY	Loose Cubic Yard
--	----------------------	-----------	---------------------------	-----	------------------

FACTOR:	Field work will be in Level "D" PPE.	PC OH	Prime Contractor Overhead	LS	Lump Sum
H&S Productivity (labor and equipment only)	MII assembly costs include HPF adjustments.	PC PF	Prime Contractor Profit	RL	Roll
Escalation to Base Year	2015 cost sources are not escalated (EF=1.00). All other costs are escalated based on the USACE WCWCIS, EM 1110-2-1304, Mar 2015.	BUR LIC	Burdened Line Item Cost	SY	Square Yard
Area Cost Factor	An AF of 1.05 is used for Oregon, except that an AF of 1.00 (national unmodified average) is used for MII assembly costs and local vendor quotes.			TN	Tons
Subcontractor Overhead and Profit	It is assumed that home office OH is 8% and profit is 9% for the Prime Contractor. Professional labor overhead is 100%. Allowances and items with mandated costs such as per diem do not have overhead and profit applied.				
Prime Contractor Overhead and Profit	Items previously developed by Anchor QEA (2010) already include contractor markups, therefore overhead and profit were not applied to those items.				
	It is assumed that OH is 1% and profit is 0% for vendor quotes for treatment and disposal at offsite disposal facilities. It is assumed that OH is 5% and profit is 0% for quotes for all other material vendor quotes.				

**Abbreviations:**

QTY	Quantity	ACR	Acres
EQUIP	Equipment	BCY	Bank Cubic Yard
MATL	Material	CLF	100 Linear Foot
HPF	HTRW Productivity Factor	DY	Days
ADJ LABOR	Adjusted Labor for HFP	EA	Each
ADJ EQUIP	Adjusted Equipment for HFP	LF	Linear Foot
UNMOD UC	Unmodified Unit Cost	HR	Hours
UNMOD LIC	Unmodified Line Item Cost	LB	Pounds
UNBUR LIC	Unburdened Line Item Cost	LCY	Loose Cubic Yard
PC OH	Prime Contractor Overhead	LS	Lump Sum
PC PF	Prime Contractor Profit	RL	Roll
BUR LIC	Burdened Line Item Cost	SY	Square Yard

TABLE CW-G10

Alternative G Cost Worksheet: CW-G10

## Capital Cost Sub-Element

## Excavation of Contaminated Sediments (From Shore for Riverbanks)

## COST WORKSHEET

Site: Portland Harbor Superfund Site Prepared By: JN Date: 7/27/2015  
 Location: Portland, Oregon  
 Phase: Draft Feasibility Study Checked By: AS Date: 7/28/2015  
 Base Year: 2015

## Work Statement:

This sub-element involves mechanical excavation from the shore of contaminated materials along the riverbanks. It includes costs for on-site labor, equipment, and materials developed from previous work.

## Cost Analysis:

Cost for Excavation from Shore for Riverbanks (Lump Sum)

COST DATABASE CODE	DESCRIPTION	QTY	UNIT(S)	HPF	LABOR	ADJ LABOR	EQUIP	ADJ EQUIP	MATL	OTHER	UNMOD UC	UNMOD LIC	PC OH	PC PF	BUR LIC	COST SOURCE CITATION	COMMENTS
P17	Dredging from Shore	123,581	CY	1.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$46.80	\$46.80	\$5,783,590.80	0%	0%	\$5,783,591	P Previous Work	Developed by Anchor QEA (2010)
TOTAL UNIT COST:															\$5,783,591		

## Notes:

HTRW productivity factor is from Exhibit B-3 or B-4 of "A Guide to Developing and Documenting Cost Estimates During the Feasibility Study", EPA 2000

The Cost Database Code is a reference code for linking with line item cost information with the cost source database and is not otherwise used within these cost worksheets.

## Source of Cost Data:

NA Not Applicable - costs are from previous work or vendor quote

For citation references, the following sources apply:

MII (MII Assemblies), GSA (www.gsa.gov), FLC (www.flcdatcenter.com), A (Allowance), V (Vendor Quote), CW (Means CostWorks 2015), P (Previous Work), and FRTR (www.frtr.gov)

## Cost Adjustment Checklist:

FACTOR:  
 H&S Productivity (labor and equipment only)  
 Escalation to Base Year  
 Area Cost Factor  
 Subcontractor Overhead and Profit  
 Prime Contractor Overhead and Profit

## NOTES:

Field work will be in Level "D" PPE.

MII assembly costs include HPF adjustments.

2015 cost sources are not escalated (EF=1.00). All other costs are escalated based on the USACE CWCCIS, EM 1110-2-1304, Mar 2015.

An AF of 1.05 is used for Oregon, except that an AF of 1.00 (national unmodified average) is used for MII assembly costs and local vendor quotes.

It is assumed that home office OH is 8% and profit is 9% for the Prime Contractor. Professional labor overhead is 100%. Allowances and items with mandated costs such as per diem do not have overhead and profit applied.

Items previously developed by Anchor QEA (2010) already include contractor markups, therefore overhead and profit were not applied to those items.

It is assumed that OH is 1% and profit is 0% for vendor quotes for treatment and disposal at offsite disposal facilities. It is assumed that OH is 5% and profit is 0% for quotes for all other material vendor quotes.

## Abbreviations:

QTY	Quantity	ACR	Acres
EQUIP	Equipment	BCY	Bank Cubic Yard
MATL	Material	CLF	100 Linear Foot
HPF	HTRW Productivity Factor	DY	Days
ADJ LABOR	Adjusted Labor for HFP	EA	Each
ADJ EQUIP	Adjusted Equipment for HFP	LF	Linear Foot
UNMOD UC	Unmodified Unit Cost	HR	Hours
UNMOD LIC	Unmodified Line Item Cost	LB	Pounds
UNBUR LIC	Unburdened Line Item Cost	LCY	Loose Cubic Yard
PC OH	Prime Contractor Overhead	LS	Lump Sum
PC PF	Prime Contractor Profit	RL	Roll
BUR LIC	Burdened Line Item Cost	SY	Square Yard
		TN	Tons

TABLE CW-G11

Alternative G Cost Worksheet: CW-G11

## Capital Cost Sub-Element

## Hydraulic Offloading of the Contaminated Sediments

## COST WORKSHEET

Site: Portland Harbor Superfund Site  
 Location: Portland, Oregon  
 Phase: Draft Feasibility Study  
 Base Year: 2015

Prepared By: AB Date: 8/11/2015

Checked By: JN Date: 8/12/2015

## Work Statement:

This sub-element involves the hydraulic offloading of contaminated sediments. The contaminated sediments would be offloaded at the transload facility (for Subtitle C/TSCA or Subtitle D disposal). It includes costs for on-site labor, equipment, and materials developed from previous work.

## Cost Analysis:

Cost for Hydraulic Offloading (Lump Sum)

COST DATABASE CODE	DESCRIPTION	QTY	UNIT(S)	HPF	LABOR	ADJ LABOR	EQUIP	ADJ EQUIP	MATL	OTHER	UNMOD UC	UNMOD LIC	PC OH	PC PF	BUR LIC	COST SOURCE CITATION	COMMENTS
	Hydraulic Offloading for Subtitle C Disposal																
P19	Hydraulic Offloading	463,227	CY	1.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$6.30	\$6.30	\$2,918,330.10	0%	0%	\$2,918,330	P Previous Work	Developed by Anchor QEA (2010)
	Hydraulic Offloading for Subtitle D Disposal																
P19	Hydraulic Offloading	7,669,810	CY	1.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$6.30	\$6.30	\$48,319,803.00	0%	0%	\$48,319,803	P Previous Work	Developed by Anchor QEA (2010)
TOTAL UNIT COST:															\$51,238,133		

## Notes:

HTRW productivity factor is from Exhibit B-3 or B-4 of "A Guide to Developing and Documenting Cost Estimates During the Feasibility Study", EPA 2000

The Cost Database Code is a reference code for linking with line item cost information with the cost source database and is not otherwise used within these cost worksheets.

## Source of Cost Data:

NA Not Applicable - costs are from previous work or vendor quote

For citation references, the following sources apply:

MII (MII Assemblies), GSA (www.gsa.gov), FLC (www.flcdatcenter.com), A (Allowance), V (Vendor Quote), CW (Means CostWorks 2015), P (Previous Work), and FRTR (www.frtr.gov)

## Cost Adjustment Checklist:

FACTOR:  
 H&S Productivity (labor and equipment only)  
 Escalation to Base Year  
 Area Cost Factor  
 Subcontractor Overhead and Profit  
 Prime Contractor Overhead and Profit

## NOTES:

Field work will be in Level "D" PPE.

MII assembly costs include HPF adjustments.

2015 cost sources are not escalated (EF=1.00). All other costs are escalated based on the USACE CWCCIS, EM 1110-2-1304, Mar 2015.

An AF of 1.05 is used for Oregon, except that an AF of 1.00 (national unmodified average) is used for MII assembly costs and local vendor quotes.

It is assumed that home office OH is 8% and profit is 9% for the Prime Contractor. Professional labor overhead is 100%. Allowances and items with mandated costs such as per diem do not have overhead and profit applied.

Items previously developed by Anchor QEA (2010) already include contractor markups, therefore overhead and profit were not applied to those items.

It is assumed that OH is 1% and profit is 0% for vendor quotes for treatment and disposal at offsite disposal facilities. It is assumed that OH is 5% and profit is 0% for quotes for all other material vendor quotes.

## Abbreviations:

QTY	Quantity	ACR	Acre
EQUIP	Equipment	BCY	Bank Cubic Yard
MATL	Material	CLF	100 Linear Foot
HPF	HTRW Productivity Factor	DY	Days
ADJ LABOR	Adjusted Labor for HFP	EA	Each
ADJ EQUIP	Adjusted Equipment for HFP	LF	Linear Foot
UNMOD UC	Unmodified Unit Cost	HR	Hours
UNMOD LIC	Unmodified Line Item Cost	LB	Pounds
UNBUR LIC	Unburdened Line Item Cost	LCY	Loose Cubic Yard
PC OH	Prime Contractor Overhead	LS	Lump Sum
PC PF	Prime Contractor Profit	RL	Roll
BUR LIC	Burdened Line Item Cost	SY	Square Yard
		TN	Tons

TABLE CW-G12

TABLE CW-G12																	
Alternative G Capital Cost Sub-Element Subtitle C/TSCA Disposal (Handling, Transportation, Treatment of Select PTW Materials, and Disposal)										COST WORKSHEET							
<b>Site:</b> Portland Harbor Superfund Site <b>Location:</b> Portland, Oregon <b>Phase:</b> Draft Feasibility Study <b>Base Year:</b> 2015										<b>Prepared By:</b> AB  <b>Checked By:</b> JN				<b>Date:</b> 8/11/2015  <b>Date:</b> 8/12/2015			
<b>Work Statement:</b> This sub-element involves the disposal of contaminated sediments at a Subtitle C/TSCA landfill, including materials handling from the barge to truck, transportation of the sediments to the Subtitle C/TSCA landfill, and disposal of contaminated sediments (including treatment for a portion of the PTW volume that is NRC/NAPL). It includes costs for on-site labor, equipment, and materials developed from previous work, as well as recent vendor quotes.																	
<b>Cost Analysis:</b> Cost for Subtitle C/TSCA Disposal (Lump Sum)																	
COST DATABASE CODE	DESCRIPTION	QTY	UNIT(S)	HPF	LABOR	ADJ LABOR	EQUIP	ADJ EQUIP	MATL	OTHER	UNMOD UC	UNMOD LIC	PC OH	PC PF	BUR LIC	COST SOURCE CITATION	COMMENTS
	<b>Materials Handling</b>																
P20	Materials Handling from Barge to Upland Stockpile	463,227	CY	1.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$10.46	\$10.46	\$4,846,512.49	0%	0%	\$4,846,512	P Previous Work	Developed by Anchor QEA (2010)
P21	Mix DE with Dredged Material to Improve Handling	107,701	TON	1.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$2.25	\$2.25	\$242,327.25	0%	0%	\$242,327	P Previous Work	Developed by Anchor QEA (2010)
M7	Diatomaceous Earth	107,701	TON	1.00	\$0.00	\$0.00	\$0.00	\$0.00	\$105.75	\$0.00	\$105.75	\$11,389,380.75	0%	0%	\$11,389,381	P Previous Work	Vendor Quote - Waste Management, 2010. Assumes 15% mixing rate.
P22	Materials Handling from Stockpile to Truck/Rail Car	463,227	CY	1.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$8.72	\$8.72	\$4,038,760.41	0%	0%	\$4,038,760	P Previous Work	Developed by Anchor QEA (2010)
	<b>Transportation and Disposal at Subtitle C/TSCA Landfill</b>																
M8	Transportation to Subtitle C/TSCA Landfill	463,227	CY	1.00	\$0.00	\$0.00	\$0.00	\$0.00	\$69.75	\$0.00	\$69.75	\$32,310,083.25	8%	9%	\$38,035,430	V Vendor Quote	Assumes truck transportation. Quote - CWM of the Northwest.
M20	Thermal Desorption Treatment at Subtitle C/TSCA Landfill (Low End of Treatment Cost Range)	231,614	CY	1.00	\$0.00	\$0.00	\$0.00	\$0.00	\$489.00	\$0.00	\$489.00	\$113,259,246.00	1%	0%	\$114,391,838	V Vendor Quote	Quote - CWM of the Northwest
M9	Thermal Desorption Treatment at Subtitle C/TSCA Landfill (High End of Treatment Cost Range)	231,613	CY	1.00	\$0.00	\$0.00	\$0.00	\$0.00	\$875.75	\$0.00	\$875.75	\$202,835,084.75	1%	0%	\$204,863,436	V Vendor Quote	Quote - CWM of the Northwest.
M10	Tipping Fee at Subtitle C/TSCA Landfill	463,227	CY	1.00	\$0.00	\$0.00	\$0.00	\$0.00	\$131.75	\$0.00	\$131.75	\$61,030,157.25	1%	0%	\$61,640,459	V Vendor Quote	Quote - CWM of the Northwest.
<b>TOTAL UNIT COST:</b>														\$439,448,143			
<b>Notes:</b> HTRW productivity factor is from Exhibit B-3 or B-4 of "A Guide to Developing and Documenting Cost Estimates During the Feasibility Study", EPA 2000 The Cost Database Code is a reference code for linking with line item cost information with the cost source database and is not otherwise used within these cost worksheets.																	
<b>Source of Cost Data:</b> NA Not Applicable - costs are from previous work or vendor quote For citation references, the following sources apply: MII (MII Assemblies), GSA (www.gsa.gov), FLC (www.flcdatcenter.com), A (Allowance), V (Vendor Quote), CW (Means CostWorks 2015), P (Previous Work), and FRTR (www.frtr.gov)																	
<b>Cost Adjustment Checklist:</b> FACTOR: H&S Productivity (labor and equipment only) Escalation to Base Year Area Cost Factor Subcontractor Overhead and Profit Prime Contractor Overhead and Profit																	
<b>NOTES:</b> Field work will be in Level "D" PPE. MII assembly costs include HPF adjustments. 2015 cost sources are not escalated (EF=1.00). All other costs are escalated based on the USACE CWCCIS, EM 1110-2-1304, Mar 2015. An AF of 1.05 is used for Oregon, except that an AF of 1.00 (national unmodified average) is used for MII assembly costs and local vendor quotes. It is assumed that home office OH is 8% and profit is 9% for the Prime Contractor. Professional labor overhead is 100%. Allowances and items with mandated costs such as per diem do not have overhead and profit applied. Items previously developed by Anchor QEA (2010) already include contractor markups, therefore overhead and profit were not applied to those items. It is assumed that OH is 1% and profit is 0% for vendor quotes for treatment and disposal at offsite disposal facilities. It is assumed that OH is 5% and profit is 0% for quotes for all other material vendor quotes.																	
<b>Abbreviations:</b> QTY Quantity EQUIP Equipment MATL Material HPF HTRW Productivity Factor ADJ LABOR Adjusted Labor for HFP ADJ EQUIP Adjusted Equipment for HFP UNMOD UC Unmodified Unit Cost UNMOD LIC Unmodified Line Item Cost UNBUR LIC Unburdened Line Item Cost PC OH Prime Contractor Overhead PC PF Prime Contractor Profit BUR LIC Burdened Line Item Cost ACR Acres BCY Bank Cubic Yard CLF 100 Linear Foot DY Days EA Each LF Linear Foot HR Hours LB Pounds LCY Loose Cubic Yard LS Lump Sum RL Roll SY Square Yard TN Tons																	

TABLE CW-G13

TABLE CW-G13																		
<div style="display: flex; justify-content: space-between;"> <div> <b>Alternative G</b>  <b>Capital Cost Sub-Element</b>  <b>Subtitle D Disposal (Handling, Transportation, and Disposal)</b> </div> <div> <b>Cost Worksheet: CW-G13</b> </div> <div> <b>COST WORKSHEET</b> </div> </div>																		
<b>Site:</b> Portland Harbor Superfund Site <b>Location:</b> Portland, Oregon <b>Phase:</b> Draft Feasibility Study <b>Base Year:</b> 2015												<b>Prepared By:</b> AB  <b>Checked By:</b> JN			<b>Date:</b> 8/11/2015  <b>Date:</b> 8/12/2015			
<b>Work Statement:</b> This sub-element involves the disposal of contaminated sediments at a Subtitle D landfill, including materials handling from the barge to truck, transportation of the sediments to the Subtitle D landfill, and disposal of contaminated sediments. It includes costs for on-site labor, equipment, and materials developed from previous work, as well as recent vendor quotes.																		
<b>Cost Analysis:</b> Cost for Subtitle D Disposal (Lump Sum)																		
COST DATABASE CODE	DESCRIPTION	QTY	UNIT(S)	HPF	LABOR	ADJ LABOR	EQUIP	ADJ EQUIP	MATL	OTHER	UNMOD UC	UNMOD LIC	PC OH	PC PF	BUR LIC	COST SOURCE CITATION	COMMENTS	
	<b>Materials Handling</b>																	
P20	Materials Handling from Barge to Upland Stockpile	7,669,810	CY	1.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$10.46	\$10.46	\$80,245,387.13	0%	0%	\$80,245,387	P Previous Work	Developed by Anchor QEA (2010)	
P21	Mix DE with Dredged Material to Improve Handling	594,411	TON	1.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$2.25	\$2.25	\$1,337,424.75	0%	0%	\$1,337,425	P Previous Work	Developed by Anchor QEA (2010)	
M7	Diatomaceous Earth	594,411	TON	1.00	\$0.00	\$0.00	\$0.00	\$0.00	\$105.75	\$0.00	\$105.75	\$62,858,963.25	0%	0%	\$62,858,963	P Previous Work	Vendor Quote - Waste Management, 2010. Assumes 5% mixing rate.	
P22	Materials Handling from Stockpile to Truck/Rail Car	7,669,810	CY	1.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$8.72	\$8.72	\$66,871,155.94	0%	0%	\$66,871,156	P Previous Work	Developed by Anchor QEA (2010)	
P37	Gondola/Rail Car Mobilization	9,000	EA	1.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$4,500.00	\$4,500.00	\$40,500,000.00	0%	0%	\$40,500,000	P Previous Work	Developed by Anchor QEA (2010)	
	<b>Transportation and Disposal at Subtitle D Landfill</b>																	
M11	Transportation and Disposal at Subtitle D Landfill	7,669,810	CY	1.00	\$0.00	\$0.00	\$0.00	\$0.00	\$90.68	\$0.00	\$90.68	\$695,498,370.80	1%	0%	\$702,453,355	P Previous Work	Quote - Republic Services (Roosevelt Landfill). Assumes rail transportation to disposal facility.	
<b>TOTAL UNIT COST:</b>																		
<b>Notes:</b> HTRW productivity factor is from Exhibit B-3 or B-4 of "A Guide to Developing and Documenting Cost Estimates During the Feasibility Study", EPA 2000 The Cost Database Code is a reference code for linking with line item cost information with the cost source database and is not otherwise used within these cost worksheets.																		
<b>Source of Cost Data:</b> NA Not Applicable - costs are from previous work or vendor quote For citation references, the following sources apply: MII (MII Assemblies), GSA (www.gsa.gov), FLC (www.flcdatabase.com), A (Allowance), V (Vendor Quote), CW (Means CostWorks 2015), P (Previous Work), and FRTR (www.frtr.gov)																		
<b>Cost Adjustment Checklist:</b> FACTOR: Field work will be in Level "D" PPE. H&S Productivity (labor and equipment only) MII assembly costs include HPF adjustments. Escalation to Base Year 2015 cost sources are not escalated (EF=1.00). All other costs are escalated based on the USACE CWCCIS, EM 1110-2-1304, Mar 2015. Area Cost Factor An AF of 1.05 is used for Oregon, except that an AF of 1.00 (national unmodified average) is used for MII assembly costs and local vendor quotes. Subcontractor Overhead and Profit It is assumed that home office OH is 8% and profit is 9% for the Prime Contractor. Professional labor overhead is 100%. Allowances and items with mandated costs such as per diem do not have overhead and profit applied. Prime Contractor Overhead and Profit Items previously developed by Anchor QEA (2010) already include contractor markups, therefore overhead and profit were not applied to those items. It is assumed that OH is 1% and profit is 0% for vendor quotes for treatment and disposal at offsite disposal facilities. It is assumed that OH is 5% and profit is 0% for quotes for all other material vendor quotes.																		
<b>Abbreviations:</b> QTY Quantity ACR Acres EQUIP Equipment BCY Bank Cubic Yard MATL Material CLF 100 Linear Foot HPF HTRW Productivity Factor DY Days ADJ LABOR Adjusted Labor for HPF EA Each ADJ EQUIP Adjusted Equipment for HFP LF Linear Foot UNMOD UC Unmodified Unit Cost HR Hours UNMOD LIC Unmodified Line Item Cost LB Pounds UNBUR LIC Unburdened Line Item Cost LCY Loose Cubic Yard PC OH Prime Contractor Overhead LS Lump Sum PC PF Prime Contractor Profit RL Roll BUR LIC Burdened Line Item Cost SY Square Yard TN Tons																		



TABLE CW-G14

<b>Alternative G</b>		<b>Cost Worksheet: CW-G14</b>		<b>COST WORKSHEET</b>													
<b>Capital Cost Sub-Element Mitigation</b>																	
<b>Site:</b>	Portland Harbor Superfund Site										<b>Prepared By:</b>	AB		<b>Date:</b>	8/11/2015		
<b>Location:</b>	Portland, Oregon										<b>Checked By:</b>	JN		<b>Date:</b>	8/12/2015		
<b>Phase:</b>	Draft Feasibility Study																
<b>Base Year:</b>	2015																
<b>Work Statement:</b>																	
This sub-element involves mitigation of shallow water and riverbank areas. It includes costs for on-site labor, equipment, and materials developed from previous work.																	
<b>Cost Analysis:</b>																	
Cost for Mitigation (Lump Sum)																	
COST DATABASE CODE	DESCRIPTION	QTY	UNIT(S)	HPF	LABOR	ADJ LABOR	EQUIP	ADJ EQUIP	MATL	OTHER	UNMOD UC	UNMOD LIC	PC OH	PC PF	BUR LIC	COST SOURCE CITATION	COMMENTS
P50	Mitigation	163	AC	1.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$2,347,130.25	\$2,347,130.25	\$382,347,517.73	0%	0%	\$382,347,518	P Previous Work	Average cost of two Lower Duwamish projects presented and referenced in Table 6.1-1 by Anchor QEA (2010).
												<b>TOTAL UNIT COST:</b>		\$382,347,518			
<b>Notes:</b>																	
HTRW productivity factor is from Exhibit B-3 or B-4 of "A Guide to Developing and Documenting Cost Estimates During the Feasibility Study", EPA 2000																	
The Cost Database Code is a reference code for linking with line item cost information with the cost source database and is not otherwise used within these cost worksheets.																	
<b>Source of Cost Data:</b>																	
NA Not Applicable - costs are from previous work or vendor quote																	
For citation references, the following sources apply:																	
MII (MII Assemblies), GSA (www.gsa.gov), FLC (www.flcdatcenter.com), A (Allowance), V (Vendor Quote), CW (Means CostWorks 2015), P (Previous Work), and FRTR (www.frtr.gov)																	
<b>Cost Adjustment Checklist:</b>																	
<b>NOTES:</b>																	
FACTOR: Field work will be in Level "D" PPE.																	
H&S Productivity (labor and equipment only) MII assembly costs include HPF adjustments.																	
Escalation to Base Year 2015 cost sources are not escalated (EF=1.00). All other costs are escalated based on the USACE CWCCIS, EM 1110-2-1304, Mar 2015.																	
Area Cost Factor An AF of 1.05 is used for Oregon, except that an AF of 1.00 (national unmodified average) is used for MII assembly costs and local vendor quotes.																	
Subcontractor Overhead and Profit It is assumed that home office OH is 8% and profit is 9% for the Prime Contractor. Professional labor overhead is 100%. Allowances and items with mandated costs such as per diem do not have overhead and profit applied.																	
Prime Contractor Overhead and Profit Items previously developed by Anchor QEA (2010) already include contractor markups, therefore overhead and profit were not applied to those items.																	
It is assumed that OH is 1% and profit is 0% for vendor quotes for treatment and disposal at offsite disposal facilities. It is assumed that OH is 5% and profit is 0% for quotes for all other material vendor quotes.																	
<b>Abbreviations:</b>																	
QTY Quantity ACR Acres																	
EQUIP Equipment BCY Bank Cubic Yard																	
MATL Material CLF 100 Linear Foot																	
HPF HTRW Productivity Factor DY Days																	
ADJ LABOR Adjusted Labor for HFP EA Each																	
ADJ EQUIP Adjusted Equipment for HFP LF Linear Foot																	
UNMOD UC Unmodified Unit Cost HR Hours																	
UNMOD LIC Unmodified Line Item Cost LB Pounds																	
UNBUR LIC Unburdened Line Item Cost LCY Loose Cubic Yard																	
PC OH Prime Contractor Overhead LS Lump Sum																	
PC PF Prime Contractor Profit RL Roll																	
BUR LIC Burdened Line Item Cost SY Square Yard																	
TN Tons																	

TABLE CW-G15

Alternative G Cost Worksheet: CW-G15

## Capital Cost Sub-Element

## Sand Placement for Technology Assignments

## COST WORKSHEET

Site: Portland Harbor Superfund Site

Prepared By: JN

Date: 7/27/2015

Location: Portland, Oregon

Phase: Draft Feasibility Study

Checked By: AS

Date: 7/28/2015

Base Year: 2015

## Work Statement:

This sub-element involves the placement of sand for the construction of capping areas. It includes placement of sand within confined areas as well as open water areas. It includes costs for on-site labor, equipment, and materials developed from previous work.

## Cost Analysis:

Cost for Sand Placement for Technology Assignments (Lump Sum)

COST DATABASE CODE	DESCRIPTION	QTY	UNIT(S)	HPF	LABOR	ADJ LABOR	EQUIP	ADJ EQUIP	MATL	OTHER	UNMOD UC	UNMOD LIC	PC OH	PC PF	BUR LIC	COST SOURCE CITATION	COMMENTS
	<b>Sand Placement (Riverbanks)</b>																
P2	Sand Placement (Confined)	69,413	LCY	1.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$49.01	\$49.01	\$3,401,584.07	0%	0%	\$3,401,584	P Previous Work	Developed by Anchor QEA (2010)
M1	Sand	69,413	LCY	1.00	\$0.00	\$0.00	\$0.00	\$0.00	\$19.71	\$0.00	\$19.71	\$1,368,130.23	0%	0%	\$1,368,130	P Previous Work	Knife River Quote #7838 (2010)
	<b>Sand Placement (Confined)</b>																
P2	Sand Placement (Confined)	162,204	LCY	1.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$49.01	\$49.01	\$7,948,807.02	0%	0%	\$7,948,807	P Previous Work	Developed by Anchor QEA (2010)
M1	Sand	162,204	LCY	1.00	\$0.00	\$0.00	\$0.00	\$0.00	\$19.71	\$0.00	\$19.71	\$3,197,040.84	0%	0%	\$3,197,041	P Previous Work	Knife River Quote #7838 (2010)
	<b>Sand Placement (Open Water)</b>																
P6	Sand Placement (Open Water)	1,868,419	LCY	1.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$23.76	\$23.76	\$44,393,635.44	0%	0%	\$44,393,635	P Previous Work	Developed by Anchor QEA (2010)
M1	Sand	1,868,419	LCY	1.00	\$0.00	\$0.00	\$0.00	\$0.00	\$19.71	\$0.00	\$19.71	\$36,826,538.49	0%	0%	\$36,826,538	P Previous Work	Knife River Quote #7838 (2010)
<b>TOTAL UNIT COST:</b>															\$97,135,735		

## Notes:

HTRW productivity factor is from Exhibit B-3 or B-4 of "A Guide to Developing and Documenting Cost Estimates During the Feasibility Study", EPA 2000

The Cost Database Code is a reference code for linking with line item cost information with the cost source database and is not otherwise used within these cost worksheets.

## Source of Cost Data:

NA Not Applicable - costs are from previous work or vendor quote

For citation references, the following sources apply:

MII (MII Assemblies), GSA (www.gsa.gov), FLC (www.flcdatcenter.com), A (Allowance), V (Vendor Quote), CW (Means CostWorks 2015), P (Previous Work), and FRTR (www.frtr.gov)

## Cost Adjustment Checklist:

FACTOR:

H&S Productivity (labor and equipment only)

Escalation to Base Year

Area Cost Factor

Subcontractor Overhead and Profit

Prime Contractor Overhead and Profit

## NOTES:

Field work will be in Level "D" PPE.

MII assembly costs include HPF adjustments.

2015 cost sources are not escalated (EF=1.00). All other costs are escalated based on the USACE CWCCIS, EM 1110-2-1304, Mar 2015.

An AF of 1.05 is used for Oregon, except that an AF of 1.00 (national unmodified average) is used for MII assembly costs and local vendor quotes.

It is assumed that home office OH is 8% and profit is 9% for the Prime Contractor. Professional labor overhead is 100%. Allowances and items with mandated costs such as per diem do not have overhead and profit applied.

Items previously developed by Anchor QEA (2010) already include contractor markups, therefore overhead and profit were not applied to those items.

It is assumed that OH is 1% and profit is 0% for vendor quotes for treatment and disposal at offsite disposal facilities. It is assumed that OH is 5% and profit is 0% for quotes for all other material vendor quotes.

## Abbreviations:

QTY	Quantity	ACR	Acres
EQUIP	Equipment	BCY	Bank Cubic Yard
MATL	Material	CLF	100 Linear Foot
HPF	HTRW Productivity Factor	DY	Days
ADJ LABOR	Adjusted Labor for HFP	EA	Each
ADJ EQUIP	Adjusted Equipment for HFP	LF	Linear Foot
UNMOD UC	Unmodified Unit Cost	HR	Hours
UNMOD LIC	Unmodified Line Item Cost	LB	Pounds
UNBUR LIC	Unburdened Line Item Cost	LCY	Loose Cubic Yard
PC OH	Prime Contractor Overhead	LS	Lump Sum
PC PF	Prime Contractor Profit	RL	Roll
BUR LIC	Burdened Line Item Cost	SY	Square Yard
		TN	Tons

TABLE CW-G16

Alternative G Cost Worksheet: CW-G16

## Capital Cost Sub-Element

## Beach Mix Placement for Technology Assignments

## COST WORKSHEET

Site: Portland Harbor Superfund Site

Prepared By: JN

Date: 7/27/2015

Location: Portland, Oregon

Phase: Draft Feasibility Study

Checked By: AS

Date: 7/28/2015

Base Year: 2015

## Work Statement:

This sub-element involves the placement of beach mix for the construction of capping areas. It includes placement of beach mix within confined areas as well as open water areas. It includes costs for on-site labor, equipment, and materials developed from previous work.

## Cost Analysis:

Cost for Beach Mix Placement for Technology Assignments (Lump Sum)

COST DATABASE CODE	DESCRIPTION	QTY	UNIT(S)	HPF	LABOR	ADJ LABOR	EQUIP	ADJ EQUIP	MATL	OTHER	UNMOD UC	UNMOD LIC	PC OH	PC PF	BUR LIC	COST SOURCE CITATION	COMMENTS
	<b>Beach Mix Placement (Riverbanks)</b>																
P5	Beach Mix Placement (Confined)	12,019	LCY	1.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$58.50	\$58.50	\$703,111.50	0%	0%	\$703,112	P Previous Work	Developed by Anchor QEA (2010)
M5	ODOT 100 Beach Mix	12,019	LCY	1.00	\$0.00	\$0.00	\$0.00	\$0.00	\$57.59	\$0.00	\$57.59	\$692,174.21	0%	0%	\$692,174	P Previous Work	Knife River Quote #7838 (2010)
	<b>Beach Mix Placement (Confined)</b>																
P5	Beach Mix Placement (Confined)	4,702	LCY	1.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$58.50	\$58.50	\$275,067.00	0%	0%	\$275,067	P Previous Work	Developed by Anchor QEA (2010)
M5	ODOT 100 Beach Mix	4,702	LCY	1.00	\$0.00	\$0.00	\$0.00	\$0.00	\$57.59	\$0.00	\$57.59	\$270,788.18	0%	0%	\$270,788	P Previous Work	Knife River Quote #7838 (2010)
	<b>Beach Mix Placement (Open Water)</b>																
P39	Beach Mix Placement (Open Water)	54,198	LCY	1.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$28.34	\$28.34	\$1,535,903.57	0%	0%	\$1,535,904	P Previous Work	Developed by Anchor QEA (2010)
M5	ODOT 100 Beach Mix	54,198	LCY	1.00	\$0.00	\$0.00	\$0.00	\$0.00	\$57.59	\$0.00	\$57.59	\$3,121,262.82	0%	0%	\$3,121,263	P Previous Work	Knife River Quote #7838 (2010)
<b>TOTAL UNIT COST:</b>															\$6,598,308		

## Notes:

HTRW productivity factor is from Exhibit B-3 or B-4 of "A Guide to Developing and Documenting Cost Estimates During the Feasibility Study", EPA 2000

The Cost Database Code is a reference code for linking with line item cost information with the cost source database and is not otherwise used within these cost worksheets.

## Source of Cost Data:

NA Not Applicable - costs are from previous work or vendor quote

For citation references, the following sources apply:

MII (MII Assemblies), GSA (www.gsa.gov), FLC (www.flcdatcenter.com), A (Allowance), V (Vendor Quote), CW (Means CostWorks 2015), P (Previous Work), and FRTR (www.frtr.gov)

## Cost Adjustment Checklist:

FACTOR:

H&S Productivity (labor and equipment only)

Escalation to Base Year

Area Cost Factor

Subcontractor Overhead and Profit

Prime Contractor Overhead and Profit

## NOTES:

Field work will be in Level "D" PPE.

MI assembly costs include HPF adjustments.

2015 cost sources are not escalated (EF=1.00). All other costs are escalated based on the USACE CWCCIS, EM 1110-2-1304, Mar 2015.

An AF of 1.05 is used for Oregon, except that an AF of 1.00 (national unmodified average) is used for MII assembly costs and local vendor quotes.

It is assumed that home office OH is 8% and profit is 9% for the Prime Contractor. Professional labor overhead is 100%. Allowances and items with mandated costs such as per diem do not have overhead and profit applied.

Items previously developed by Anchor QEA (2010) already include contractor markups, therefore overhead and profit were not applied to those items.

It is assumed that OH is 1% and profit is 0% for vendor quotes for treatment and disposal at offsite disposal facilities. It is assumed that OH is 5% and profit is 0% for quotes for all other material vendor quotes.

## Abbreviations:

QTY	Quantity	ACR	Acres
EQUIP	Equipment	BCY	Bank Cubic Yard
MATL	Material	CLF	100 Linear Foot
HPF	HTRW Productivity Factor	DY	Days
ADJ LABOR	Adjusted Labor for HFP	EA	Each
ADJ EQUIP	Adjusted Equipment for HFP	LF	Linear Foot
UNMOD UC	Unmodified Unit Cost	HR	Hours
UNMOD LIC	Unmodified Line Item Cost	LB	Pounds
UNBUR LIC	Unburdened Line Item Cost	LCY	Loose Cubic Yard
PC OH	Prime Contractor Overhead	LS	Lump Sum
PC PF	Prime Contractor Profit	RL	Roll
BUR LIC	Burdened Line Item Cost	SY	Square Yard
		TN	Tons

TABLE CW-G17

Alternative G Cost Worksheet: CW-G17

## Capital Cost Sub-Element

## Armor Placement for Technology Assignments

## COST WORKSHEET

Site: Portland Harbor Superfund Site

Prepared By: JN

Date: 7/27/2015

Location: Portland, Oregon

Phase: Draft Feasibility Study

Checked By: AS

Date: 7/28/2015

Base Year: 2015

## Work Statement:

This sub-element involves the placement of armor for the construction of capping areas. It includes placement of armor with confined areas as well as open water areas. It includes costs for on-site labor, equipment, and materials developed from previous work.

## Cost Analysis:

Cost for Armor Placement for Technology Assignments (Lump Sum)

COST DATABASE CODE	DESCRIPTION	QTY	UNIT(S)	HPF	LABOR	ADJ LABOR	EQUIP	ADJ EQUIP	MATL	OTHER	UNMOD UC	UNMOD LIC	PC OH	PC PF	BUR LIC	COST SOURCE CITATION	COMMENTS
	Armor Placement (Riverbanks)																
P3	ODOT 200 Placement (Confined)	11,839	LCY	1.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$58.50	\$58.50	\$698,431.50	0%	0%	\$698,432	P Previous Work	Developed by Anchor QEA (2010)
M2	ODOT 200 Armor	11,839	LCY	1.00	\$0.00	\$0.00	\$0.00	\$0.00	\$57.59	\$0.00	\$57.59	\$687,567.01	0%	0%	\$687,567	P Previous Work	Knife River Quote #7838 (2010)
	Armor Placement (Confined)																
P3	ODOT 200 Placement (Confined)	44,126	LCY	1.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$58.50	\$58.50	\$2,581,371.00	0%	0%	\$2,581,371	P Previous Work	Developed by Anchor QEA (2010)
M2	ODOT 200 Armor	44,126	LCY	1.00	\$0.00	\$0.00	\$0.00	\$0.00	\$57.59	\$0.00	\$57.59	\$2,541,216.34	0%	0%	\$2,541,216	P Previous Work	Knife River Quote #7838 (2010)
	Armor Placement (Open Water)																
P7	ODOT 200 Placement (Open Water)	206,689	LCY	1.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$28.34	\$28.34	\$5,857,307.90	0%	0%	\$5,857,308	P Previous Work	Developed by Anchor QEA (2010)
M2	ODOT 200 Armor	206,689	LCY	1.00	\$0.00	\$0.00	\$0.00	\$0.00	\$57.59	\$0.00	\$57.59	\$11,903,219.51	0%	0%	\$11,903,220	P Previous Work	Knife River Quote #7838 (2010)
TOTAL UNIT COST:															\$24,269,114		

## Notes:

HTRW productivity factor is from Exhibit B-3 or B-4 of "A Guide to Developing and Documenting Cost Estimates During the Feasibility Study", EPA 2000

The Cost Database Code is a reference code for linking with line item cost information with the cost source database and is not otherwise used within these cost worksheets.

## Source of Cost Data:

NA Not Applicable - costs are from previous work or vendor quote

For citation references, the following sources apply:

MII (MII Assemblies), GSA (www.gsa.gov), FLC (www.flcdatcenter.com), A (Allowance), V (Vendor Quote), CW (Means CostWorks 2015), P (Previous Work), and FRTR (www.frtr.gov)

## Cost Adjustment Checklist:

FACTOR:

H&S Productivity (labor and equipment only)

Escalation to Base Year

Area Cost Factor

Subcontractor Overhead and Profit

Prime Contractor Overhead and Profit

## NOTES:

Field work will be in Level "D" PPE.

MI assembly costs include HPF adjustments.

2015 cost sources are not escalated (EF=1.00). All other costs are escalated based on the USACE CWCCIS, EM 1110-2-1304, Mar 2015.

An AF of 1.05 is used for Oregon, except that an AF of 1.00 (national unmodified average) is used for MII assembly costs and local vendor quotes.

It is assumed that home office OH is 8% and profit is 9% for the Prime Contractor. Professional labor overhead is 100%. Allowances and items with mandated costs such as per diem do not have overhead and profit applied.

Items previously developed by Anchor QEA (2010) already include contractor markups, therefore overhead and profit were not applied to those items.

It is assumed that OH is 1% and profit is 0% for vendor quotes for treatment and disposal at offsite disposal facilities. It is assumed that OH is 5% and profit is 0% for quotes for all other material vendor quotes.

## Abbreviations:

QTY	Quantity	ACR	Acres
EQUIP	Equipment	BCY	Bank Cubic Yard
MATL	Material	CLF	100 Linear Foot
HPF	HTRW Productivity Factor	DY	Days
ADJ LABOR	Adjusted Labor for HFP	EA	Each
ADJ EQUIP	Adjusted Equipment for HFP	LF	Linear Foot
UNMOD UC	Unmodified Unit Cost	HR	Hours
UNMOD LIC	Unmodified Line Item Cost	LB	Pounds
UNBUR LIC	Unburdened Line Item Cost	LCY	Loose Cubic Yard
PC OH	Prime Contractor Overhead	LS	Lump Sum
PC PF	Prime Contractor Profit	RL	Roll
BUR LIC	Burdened Line Item Cost	SY	Square Yard
		TN	Tons

## TABLE CW-G18

Alternative G	Cost Worksheet: CW-G18	<b>COST WORKSHEET</b>
Capital Cost Sub-Element		

<b>Site:</b>	Portland Harbor Superfund Site	<b>Prepared By:</b>	JN	<b>Date:</b>	7/27/2015
<b>Location:</b>	Portland, Oregon				
<b>Phase:</b>	Draft Feasibility Study	<b>Checked By:</b>	AS	<b>Date:</b>	7/28/2015
<b>Base Year:</b>	2015				

**Work Statement:**  
This sub-element involves the placement of the reactive layers for the construction of capping areas. It includes placement of armor within confined areas as well as open water areas. It includes costs for on-site labor, equipment, and materials developed from previous work, as well as recent vendor quotes.

**Cost Analysis:**  
Cost for Reactive/GAC Placement for Technology Assignments (Lump Sum)

COST DATABASE CODE	DESCRIPTION	QTY	UNIT(S)	HPF	LABOR	ADJ LABOR	EQUIP	ADJ EQUIP	MATL	OTHER	UNMOD UC	UNMOD LIC	PC OH	PC PF	BUR LIC	COST SOURCE CITATION	COMMENTS
	<b>Reactive/GAC Placement (Riverbanks)</b>																
P40	Carbon (AquaGate + PAC 5%) Placement (Confined)	1,247	TON	1.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$816.75	\$816.75	\$1,018,487.25	0%	0%	\$1,018,487	P Previous Work	Adapted from unit cost developed by Anchor QEA (2010). Unit cost is \$/TON as carbon
M4	Carbon (AquaGate + PAC 5%)	1,247	TON	1.00	\$0.00	\$0.00	\$0.00	\$0.00	\$8,000.00	\$0.00	\$8,000.00	\$9,976,000.00	5%	0%	\$10,474,800	V Vendor Quote	Vendor Quote - AquaBlok 2015. Material cost is \$/TON (as Carbon).
	<b>Reactive/GAC Placement (Confined)</b>																
P40	Carbon (AquaGate + PAC 5%) Placement (Confined)	1,885	TON	1.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$816.75	\$816.75	\$1,539,573.75	0%	0%	\$1,539,574	P Previous Work	Adapted from unit cost developed by Anchor QEA (2010). Unit cost is \$/TON as carbon
M4	Carbon (AquaGate + PAC 5%)	1,885	TON	1.00	\$0.00	\$0.00	\$0.00	\$0.00	\$8,000.00	\$0.00	\$8,000.00	\$15,080,000.00	5%	0%	\$15,834,000	V Vendor Quote	Vendor Quote - AquaBlok 2015. Material cost is \$/TON (as Carbon).
	<b>Reactive/GAC Placement (Open Water)</b>																
P41	Carbon (AquaGate + PAC 5%) Placement (Open Water)	18,431	TON	1.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$396.00	\$396.00	\$7,298,676.00	0%	0%	\$7,298,676	P Previous Work	Adapted from unit cost developed by Anchor QEA (2010). Unit cost is \$/TON as carbon.
M4	Carbon (AquaGate + PAC 5%)	18,431	TON	1.00	\$0.00	\$0.00	\$0.00	\$0.00	\$8,000.00	\$0.00	\$8,000.00	\$147,448,000.00	5%	0%	\$154,820,400	V Vendor Quote	Vendor Quote - AquaBlok 2015. Material cost is \$/TON (as Carbon).
												<b>TOTAL UNIT COST:</b>		\$190,985,937			

<b>Notes:</b>		<b>Abbreviations:</b>	
HTRW productivity factor is from Exhibit B-3 or B-4 of "A Guide to Developing and Documenting Cost Estimates During the Feasibility Study", EPA 2000		QTY	Quantity
The Cost Database Code is a reference code for linking with line item cost information with the cost source database and is not otherwise used within these cost worksheets.		EQUIP	Equipment
		ACR	Acre
		BCY	Bank Cubic Yard

**Source of Cost Data:**

NA Not Applicable - costs are from previous work or vendor quote

For citation references, the following sources apply:

MI (MI Assemblies), GSA ([www.gsa.gov](http://www.gsa.gov)), FLC ([www.flcdatacenter.com](http://www.flcdatacenter.com)), A (Allowance), V (Vendor Quote), CW (Means CostWorks 2015), P (Previous Work), and FRTR ([www.ftrr.gov](http://www.ftrr.gov))

<u>Cost Adjustment Checklist:</u>	<u>NOTES:</u>	UNBUR LIC	Unburdened Line Item Cost	LCY	Loose Cubic Yard
FACTOR:	Field work will be in Level "D" PPE.	PC OH	Prime Contractor Overhead	LS	Lump Sum
H&S Productivity (labor and equipment only)	MII assembly costs include HPF adjustments.	PC PF	Prime Contractor Profit	RL	Roll
Escalation to Base Year	2015 cost sources are not escalated (EF=1.00). All other costs are escalated based on the USACE WCWCCS, EM 1110-2-1304, Mar 2015.	BUR LIC	Burdened Line Item Cost	SY	Square Yard
Area Cost Factor	An AF of 1.05 is used for Oregon, except that an AF of 1.00 (national unmodified average) is used for MII assembly costs and local vendor quotes.			TN	Tons
Subcontractor Overhead and Profit	It is assumed that home office OH is 8% and profit is 9% for the Prime Contractor. Professional labor overhead is 100%. Allowances and items with mandated costs such as per diem do not have overhead and profit applied.				
Prime Contractor Overhead and Profit	Items previously developed by Anchor QEA (2010) already include contractor markups, therefore overhead and profit were not applied to those items. It is assumed that OH is 1% and profit is 0% for vendor quotes for treatment and disposal at offsite disposal facilities. It is assumed that OH is 5% and profit is 0% for quotes for all other material vendor quotes.				

TABLE CW-G19

**Alternative G**  
**Capital Cost Sub-Element**  
**Geofabric for Riverbanks**

**Cost Worksheet: CW-G19**

**COST WORKSHEET**

**Site:** Portland Harbor Superfund Site  
**Location:** Portland, Oregon  
**Phase:** Draft Feasibility Study  
**Base Year:** 2015

**Prepared By:** JN **Date:** 7/27/2015

**Checked By:** AS **Date:** 7/28/2015

**Work Statement:**

This sub-element involves the installation of geofabric along the riverbanks. It includes costs for on-site labor, equipment, and materials developed from previous work.

**Cost Analysis:**

Cost for Geofabric for Riverbanks (Lump Sum)

COST DATABASE CODE	DESCRIPTION	QTY	UNIT(S)	HPF	LABOR	ADJ LABOR	EQUIP	ADJ EQUIP	MATL	OTHER	UNMOD UC	UNMOD LIC	PC OH	PC PF	BUR LIC	COST SOURCE CITATION	COMMENTS
P51	Geotextile Installation	25.2	AC	1.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$7,060.20	\$7,060.20	\$177,917.16	8%	9%	\$209,444	P Previous Work	Vendor Quote - Geo-Synthetics (2014). Includes labor and equipment for installation
M13	Geotextile	25.2	AC	1.00	\$0.00	\$0.00	\$0.00	\$0.00	\$5,687.39	\$0.00	\$5,687.39	\$143,322.23	5%	0%	\$150,488	V Vendor Quote	Vendor Quote (2014)
<b>TOTAL UNIT COST:</b>															<b>\$359,932</b>		

**Notes:**

HTRW productivity factor is from Exhibit B-3 or B-4 of "A Guide to Developing and Documenting Cost Estimates During the Feasibility Study", EPA 2000

The Cost Database Code is a reference code for linking with line item cost information with the cost source database and is not otherwise used within these cost worksheets.

**Source of Cost Data:**

NA Not Applicable - costs are from previous work or vendor quote

For citation references, the following sources apply:

MII (MII Assemblies), GSA (www.gsa.gov), FLC (www.flcdatcenter.com), A (Allowance), V (Vendor Quote), CW (Means CostWorks 2015), P (Previous Work), and FRTR (www.frtr.gov)

**Cost Adjustment Checklist:**

FACTOR:  
H&S Productivity (labor and equipment only)  
Escalation to Base Year  
Area Cost Factor  
Subcontractor Overhead and Profit  
Prime Contractor Overhead and Profit

**NOTES:**

Field work will be in Level "D" PPE.

MII assembly costs include HPF adjustments.

2015 cost sources are not escalated (EF=1.00). All other costs are escalated based on the USACE CWCCIS, EM 1110-2-1304, Mar 2015.

An AF of 1.05 is used for Oregon, except that an AF of 1.00 (national unmodified average) is used for MII assembly costs and local vendor quotes.

It is assumed that home office OH is 8% and profit is 9% for the Prime Contractor. Professional labor overhead is 100%. Allowances and items with mandated costs such as per diem do not have overhead and profit applied.

Items previously developed by Anchor QEA (2010) already include contractor markups, therefore overhead and profit were not applied to those items.

It is assumed that OH is 1% and profit is 0% for vendor quotes for treatment and disposal at offsite disposal facilities. It is assumed that OH is 5% and profit is 0% for quotes for all other material vendor quotes.

**Abbreviations:**

QTY	Quantity	ACR	Acres
EQUIP	Equipment	BCY	Bank Cubic Yard
MATL	Material	CLF	100 Linear Foot
HPF	HTRW Productivity Factor	DY	Days
ADJ LABOR	Adjusted Labor for HFP	EA	Each
ADJ EQUIP	Adjusted Equipment for HFP	LF	Linear Foot
UNMOD UC	Unmodified Unit Cost	HR	Hours
UNMOD LIC	Unmodified Line Item Cost	LB	Pounds
UNBUR LIC	Unburdened Line Item Cost	LCY	Loose Cubic Yard
PC OH	Prime Contractor Overhead	LS	Lump Sum
PC PF	Prime Contractor Profit	RL	Roll
BUR LIC	Burdened Line Item Cost	SY	Square Yard
		TN	Tons

TABLE CW-G20

Alternative G Cost Worksheet: CW-G20

## Capital Cost Sub-Element

## Organoclay Mat Placement for Technology Assignments

## COST WORKSHEET

Site: Portland Harbor Superfund Site

Prepared By: JN

Date: 7/27/2015

Location: Portland, Oregon

Phase: Draft Feasibility Study

Checked By: AS

Date: 7/28/2015

Base Year: 2015

## Work Statement:

This sub-element involves the placement of the organoclay mat for the construction of capping areas. It includes placement of the organoclay mat within confined areas as well as open water areas. It includes costs for on-site labor, equipment, and materials developed from previous work.

## Cost Analysis:

Cost for Organoclay Mat Placement for Technology Assignments (Lump Sum)

COST DATABASE CODE	DESCRIPTION	QTY	UNIT(S)	HPF	LABOR	ADJ LABOR	EQUIP	ADJ EQUIP	MATL	OTHER	UNMOD UC	UNMOD LIC	PC OH	PC PF	BUR LIC	COST SOURCE CITATION	COMMENTS
	<b>Organoclay Mat Placement (Riverbanks)</b>																
P23	Organoclay Mat Material and Placement (Confined)	43,560	SF	1.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$23.74	\$23.74	\$1,034,005.50	0%	0%	\$1,034,006	P Previous Work	Developed by Anchor QEA (2010)
	<b>Organoclay Mat Placement (Confined)</b>																
P23	Organoclay Mat Material and Placement (Confined)	139,392	SF	1.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$23.74	\$23.74	\$3,308,817.60	0%	0%	\$3,308,818	P Previous Work	Developed by Anchor QEA (2010)
	<b>Organoclay Mat Placement (Open Water)</b>																
P24	Organoclay Mat Material and Placement (Open)	723,096	SF	1.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$7.09	\$7.09	\$5,124,942.90	0%	0%	\$5,124,943	P Previous Work	Developed by Anchor QEA (2010)
												<b>TOTAL UNIT COST:</b>			\$9,467,767		

## Notes:

HTRW productivity factor is from Exhibit B-3 or B-4 of "A Guide to Developing and Documenting Cost Estimates During the Feasibility Study", EPA 2000

The Cost Database Code is a reference code for linking with line item cost information with the cost source database and is not otherwise used within these cost worksheets.

## Source of Cost Data:

NA Not Applicable - costs are from previous work or vendor quote

For citation references, the following sources apply:

MII (MII Assemblies), GSA (www.gsa.gov), FLC (www.flcdatcenter.com), A (Allowance), V (Vendor Quote), CW (Means CostWorks 2015), P (Previous Work), and FRTR (www.frtr.gov)

## Cost Adjustment Checklist:

FACTOR:

H&S Productivity (labor and equipment only)

Escalation to Base Year

Area Cost Factor

Subcontractor Overhead and Profit

Prime Contractor Overhead and Profit

## NOTES:

Field work will be in Level "D" PPE.

MII assembly costs include HPF adjustments.

2015 cost sources are not escalated (EF=1.00). All other costs are escalated based on the USACE CWCCIS, EM 1110-2-1304, Mar 2015.

An AF of 1.05 is used for Oregon, except that an AF of 1.00 (national unmodified average) is used for MII assembly costs and local vendor quotes.

It is assumed that home office OH is 8% and profit is 9% for the Prime Contractor. Professional labor overhead is 100%. Allowances and items with mandated costs such as per diem do not have overhead and profit applied.

Items previously developed by Anchor QEA (2010) already include contractor markups, therefore overhead and profit were not applied to those items.

It is assumed that OH is 1% and profit is 0% for vendor quotes for treatment and disposal at offsite disposal facilities. It is assumed that OH is 5% and profit is 0% for quotes for all other material vendor quotes.

## Abbreviations:

QTY	Quantity	ACR	Acres
EQUIP	Equipment	BCY	Bank Cubic Yard
MATL	Material	CLF	100 Linear Foot
HPF	HTRW Productivity Factor	DY	Days
ADJ LABOR	Adjusted Labor for HFP	EA	Each
ADJ EQUIP	Adjusted Equipment for HFP	LF	Linear Foot
UNMOD UC	Unmodified Unit Cost	HR	Hours
UNMOD LIC	Unmodified Line Item Cost	LB	Pounds
UNBUR LIC	Unburdened Line Item Cost	LCY	Loose Cubic Yard
PC OH	Prime Contractor Overhead	LS	Lump Sum
PC PF	Prime Contractor Profit	RL	Roll
BUR LIC	Burdened Line Item Cost	SY	Square Yard
		TN	Tons

TABLE CW-G21

<div style="display: flex; justify-content: space-between;"> <div> <b>Alternative G</b>  <b>Capital Cost Sub-Element</b>  <b>Transload Facility Development</b> </div> <div> <b>Cost Worksheet: CW-G21</b> </div> <div> <b>COST WORKSHEET</b> </div> </div>																	
<b>Site:</b> Portland Harbor Superfund Site <b>Location:</b> Portland, Oregon <b>Phase:</b> Draft Feasibility Study <b>Base Year:</b> 2015												<b>Prepared By:</b> JN  <b>Checked By:</b> AS		<b>Date:</b> 7/27/2015  <b>Date:</b> 7/28/2015			
<b>Work Statement:</b> This sub-element involves the development of a transload facility for facilitating offsite disposal of contaminated sediments. It includes costs for on-site labor, equipment, and materials developed from previous work. Transload facility is expected to be operated for 18 years, based on estimated construction duration.																	
<b>Cost Analysis:</b> Cost for Transload Facility Development (Lump Sum)																	
COST DATABASE CODE	DESCRIPTION	QTY	UNIT(S)	HPF	LABOR	ADJ LABOR	EQUIP	ADJ EQUIP	MATL	OTHER	UNMOD UC	UNMOD LIC	PC OH	PC PF	BUR LIC	COST SOURCE CITATION	COMMENTS
	<b>Transload Facility Development</b>																
P31	Transload Facility Permitting	1	LS	1.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$45,000.00	\$45,000.00	\$45,000.00	0%	0%	\$45,000	P Previous Work	Developed by Anchor QEA (2010)
P32	Transload Facility Development	1	LS	1.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$8,437,500.00	\$8,437,500.00	\$8,437,500.00	0%	0%	\$8,437,500	P Previous Work	Developed by Anchor QEA (2010)
P33	Yearly Property Lease	360	AC	1.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$26,437.50	\$26,437.50	\$9,517,500.00	0%	0%	\$9,517,500	P Previous Work	Developed by Anchor QEA (2010)
	<b>Inspection and Monitoring of Transload Facility</b>																
P34	Labor Inspections During Operations of Transload Facility	45.0	FTE	1.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$84,375.00	\$84,375.00	\$3,796,875.00	0%	0%	\$3,796,875	P Previous Work	Developed by Anchor QEA (2010)
P35	Environmental Monitoring During Offloading a Transload Facility	72	MO	1.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$16,875.00	\$16,875.00	\$1,215,000.00	0%	0%	\$1,215,000	P Previous Work	Developed by Anchor QEA (2010)
P36	Inspection and Monitoring Reporting for Transload Facility	18	YR	1.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$45,000.00	\$45,000.00	\$810,000.00	0%	0%	\$810,000	P Previous Work	Developed by Anchor QEA (2010)
												<b>TOTAL UNIT COST:</b>		\$23,821,875			
<div style="display: flex;"> <div style="flex: 1;"> <b>Notes:</b>            HTRW productivity factor is from Exhibit B-3 or B-4 of "A Guide to Developing and Documenting Cost Estimates During the Feasibility Study", EPA 2000            The Cost Database Code is a reference code for linking with line item cost information with the cost source database and is not otherwise used within these cost worksheets.   <b>Source of Cost Data:</b>            NA Not Applicable - costs are from previous work or vendor quote            For citation references, the following sources apply:            MII (MII Assemblies), GSA (www.gsa.gov), FLC (www.flcdatcenter.com), A (Allowance), V (Vendor Quote), CW (Means CostWorks 2015), P (Previous Work), and FRTR (www.frtr.gov)         </div> <div style="flex: 1;"> <b>Abbreviations:</b>            QTY Quantity            EQUIP Equipment            MATL Material            HPF HTRW Productivity Factor            ADJ LABOR Adjusted Labor for HFP            ADJ EQUIP Adjusted Equipment for HFP            UNMOD UC Unmodified Unit Cost            UNMOD LIC Unmodified Line Item Cost            UNBUR LIC Unburdened Line Item Cost            PC OH Prime Contractor Overhead            PC PF Prime Contractor Profit            BUR LIC Burdened Line Item Cost         </div> <div style="flex: 1;">           ACR Acres            BCY Bank Cubic Yard            CLF 100 Linear Foot            DY Days            EA Each            LF Linear Foot            HR Hours            LB Pounds            LCY Loose Cubic Yard            LS Lump Sum            RL Roll            SY Square Yard            TN Tons         </div> </div>																	
<div style="display: flex;"> <div style="flex: 1;"> <b>Cost Adjustment Checklist:</b>            FACTOR:            H&amp;S Productivity (labor and equipment only)            Escalation to Base Year            Area Cost Factor            Subcontractor Overhead and Profit            Prime Contractor Overhead and Profit         </div> <div style="flex: 1;"> <b>NOTES:</b>            Field work will be in Level "D" PPE.            MII assembly costs include HPF adjustments.            2015 cost sources are not escalated (EF=1.00). All other costs are escalated based on the USACE CWCCIS, EM 1110-2-1304, Mar 2015.            An AF of 1.05 is used for Oregon, except that an AF of 1.00 (national unmodified average) is used for MII assembly costs and local vendor quotes.            It is assumed that home office OH is 8% and profit is 9% for the Prime Contractor. Professional labor overhead is 100%. Allowances and items with mandated costs such as per diem do not have overhead and profit applied.            Items previously developed by Anchor QEA (2010) already include contractor markups, therefore overhead and profit were not applied to those items.            It is assumed that OH is 1% and profit is 0% for vendor quotes for treatment and disposal at offsite disposal facilities. It is assumed that OH is 5% and profit is 0% for quotes for all other material vendor quotes.         </div> </div>																	



TABLE CW-G22

TABLE CW-G22																		
Alternative G      Cost Worksheet:    CW-G22												COST WORKSHEET						
Capital Cost Sub-Element Monitored Natural Recovery (MNR) for MNR/Enhanced Monitored Natural Recovery (EMNR) and Broadcast GAC Areas																		
<b>Site:</b> Portland Harbor Superfund Site												<b>Prepared By:</b> JN			<b>Date:</b> 7/27/2015			
<b>Location:</b> Portland, Oregon																		
<b>Phase:</b> Draft Feasibility Study												<b>Checked By:</b> AS			<b>Date:</b> 7/28/2015			
<b>Base Year:</b> 2015																		
<b>Work Statement:</b> This sub-element involves sampling as part of monitored natural recovery for MNR, EMNR, and Broadcast GAC areas. It includes costs for on-site labor, equipment, and materials developed from previous work.																		
<b>Cost Analysis:</b> Cost for Monitored Natural Recovery for MNR/EMNR and Broadcast GAC Areas (Lump Sum)																		
COST DATABASE CODE	DESCRIPTION	QTY	UNIT(S)	HPF	LABOR	ADJ LABOR	EQUIP	ADJ EQUIP	MATL	OTHER	UNMOD UC	UNMOD LIC	PC OH	PC PF	BUR LIC	COST SOURCE CITATION	COMMENTS	
P25	Monitored Natural Recovery	1,864	AC	1.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$3,679.79	\$3,679.79	\$6,859,119.24	0%	0%	\$6,859,119	P	Previous Work	Developed by Anchor QEA (2010)
TOTAL UNIT COST:															\$6,859,119			
<b>Notes:</b> HTRW productivity factor is from Exhibit B-3 or B-4 of "A Guide to Developing and Documenting Cost Estimates During the Feasibility Study", EPA 2000 The Cost Database Code is a reference code for linking with line item cost information with the cost source database and is not otherwise used within these cost worksheets.																		
<b>Source of Cost Data:</b> NA Not Applicable - costs are from previous work or vendor quote For citation references, the following sources apply: MII (MII Assemblies), GSA (www.gsa.gov), FLC (www.flcdatcenter.com), A (Allowance), V (Vendor Quote), CW (Means CostWorks 2015), P (Previous Work), and FRTR (www.frtr.gov)																		
<b>Cost Adjustment Checklist:</b> FACTOR: Field work will be in Level "D" PPE. H&S Productivity (labor and equipment only) MII assembly costs include HPF adjustments. Escalation to Base Year 2015 cost sources are not escalated (EF=1.00). All other costs are escalated based on the USACE CWCCIS, EM 1110-2-1304, Mar 2015. Area Cost Factor An AF of 1.05 is used for Oregon, except that an AF of 1.00 (national unmodified average) is used for MII assembly costs and local vendor quotes. Subcontractor Overhead and Profit It is assumed that home office OH is 8% and profit is 9% for the Prime Contractor. Professional labor overhead is 100%. Allowances and items with mandated costs such as per diem do not have overhead and profit applied. Prime Contractor Overhead and Profit Items previously developed by Anchor QEA (2010) already include contractor markups, therefore overhead and profit were not applied to those items. It is assumed that OH is 1% and profit is 0% for vendor quotes for treatment and disposal at offsite disposal facilities. It is assumed that OH is 5% and profit is 0% for quotes for all other material vendor quotes.																		
<b>Abbreviations:</b> QTY Quantity ACR Acres EQUIP Equipment BCY Bank Cubic Yard MATL Material CLF 100 Linear Foot HPF HTRW Productivity Factor DY Days ADJ LABOR Adjusted Labor for HFP EA Each ADJ EQUIP Adjusted Equipment for HFP LF Linear Foot UNMOD UC Unmodified Unit Cost HR Hours UNMOD LIC Unmodified Line Item Cost LB Pounds UNBUR LIC Unburdened Line Item Cost LCY Loose Cubic Yard PC OH Prime Contractor Overhead LS Lump Sum PC PF Prime Contractor Profit RL Roll BUR LIC Burdened Line Item Cost SY Square Yard TN Tons																		

TABLE CW-G23

**Alternative G**  
**Capital Cost Sub-Element**  
**Site-Wide Monitoring**

**Cost Worksheet: CW-G23**

**COST WORKSHEET**

**Site:** Portland Harbor Superfund Site  
**Location:** Portland, Oregon  
**Phase:** Draft Feasibility Study  
**Base Year:** 2015

**Prepared By:** JN  
**Date:** 7/27/2015

**Checked By:** AS  
**Date:** 7/28/2015

**Work Statement:**

This sub-element involves sampling, surveying, data management, and reporting as part of sitewide monitoring. It includes costs for on-site labor, equipment, and materials developed from previous work.

**Cost Analysis:**

Cost for Site-Wide Monitoring (Lump Sum)

COST DATABASE CODE	DESCRIPTION	QTY	UNIT(S)	HPF	LABOR	ADJ LABOR	EQUIP	ADJ EQUIP	MATL	OTHER	UNMOD UC	UNMOD LIC	PC OH	PC PF	BUR LIC	COST SOURCE CITATION	COMMENTS
	<b>Site-Wide Monitoring</b>																
P26	Sitewide Monitoring	1	LS	1.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$955,959.75	\$955,959.75	\$955,959.75	0%	0%	\$955,960	P Previous Work	Includes onsite dust control and pavement washing
<b>TOTAL UNIT COST:</b>															\$955,960		

**Notes:**

HTRW productivity factor is from Exhibit B-3 or B-4 of "A Guide to Developing and Documenting Cost Estimates During the Feasibility Study", EPA 2000

The Cost Database Code is a reference code for linking with line item cost information with the cost source database and is not otherwise used within these cost worksheets.

**Source of Cost Data:**

NA Not Applicable - costs are from previous work or vendor quote

For citation references, the following sources apply:

MII (MII Assemblies), GSA (www.gsa.gov), FLC (www.flcdatcenter.com), A (Allowance), V (Vendor Quote), CW (Means CostWorks 2015), P (Previous Work), and FRTR (www.frtr.gov)

**Cost Adjustment Checklist:**

**FACTOR:**

H&S Productivity (labor and equipment only)

Escalation to Base Year

Area Cost Factor

Subcontractor Overhead and Profit

Prime Contractor Overhead and Profit

**NOTES:**

Field work will be in Level "D" PPE.

MII assembly costs include HPF adjustments.

2015 cost sources are not escalated (EF=1.00). All other costs are escalated based on the USACE CWCIS, EM 1110-2-1304, Mar 2015.

An AF of 1.05 is used for Oregon, except that an AF of 1.00 (national unmodified average) is used for MII assembly costs and local vendor quotes.

It is assumed that home office OH is 8% and profit is 9% for the Prime Contractor. Professional labor overhead is 100%. Allowances and items with mandated costs such as per diem do not have overhead and profit applied.

Items previously developed by Anchor QEA (2010) already include contractor markups, therefore overhead and profit were not applied to those items.

It is assumed that OH is 1% and profit is 0% for vendor quotes for treatment and disposal at offsite disposal facilities. It is assumed that OH is 5% and profit is 0% for quotes for all other material vendor quotes.

**Abbreviations:**

QTY	Quantity	ACR	Acres
EQUIP	Equipment	BCY	Bank Cubic Yard
MATL	Material	CLF	100 Linear Foot
HPF	HTRW Productivity Factor	DY	Days
ADJ LABOR	Adjusted Labor for HFP	EA	Each
ADJ EQUIP	Adjusted Equipment for HFP	LF	Linear Foot
UNMOD UC	Unmodified Unit Cost	HR	Hours
UNMOD LIC	Unmodified Line Item Cost	LB	Pounds
UNBUR LIC	Unburdened Line Item Cost	LCY	Loose Cubic Yard
PC OH	Prime Contractor Overhead	LS	Lump Sum
PC PF	Prime Contractor Profit	RL	Roll
BUR LIC	Burdened Line Item Cost	SY	Square Yard
		TN	Tons

TABLE CW-G24

Alternative G																	Cost Worksheet: CW-G24		COST WORKSHEET	
Capital Cost Sub-Element																				
Cap Area Monitoring and Reactive Layer Monitoring																				
Site: Portland Harbor Superfund Site																	Prepared By: JN		Date: 7/27/2015	
Location: Portland, Oregon																				
Phase: Draft Feasibility Study																	Checked By: AS		Date: 7/28/2015	
Base Year: 2015																				
Work Statement:																				
This sub-element involves sampling, surveying, data management, and reporting as part of cap and reactive layer monitoring. It includes costs for on-site labor, equipment, and materials developed from previous work.																				
Cost Analysis:																				
Cost for Cap and Reactive Layer Monitoring (Lump Sum)																				
COST DATABASE CODE	DESCRIPTION	QTY	UNIT(S)	HPF	LABOR	ADJ LABOR	EQUIP	ADJ EQUIP	MATL	OTHER	UNMOD UC	UNMOD LIC	PC OH	PC PF	BUR LIC	COST SOURCE CITATION	COMMENTS			
	Cap Area Monitoring																			
P27	Cap Monitoring	417	AC	1.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$78,821.21	\$78,821.21	\$32,829,035.01	0%	0%	\$32,829,035	P Previous Work	Developed by Anchor QEA (2010)			
	Reactive Layer Monitoring																			
P28	Reactive Layer Monitoring	275.4	AC	1.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$88,810.88	\$88,810.88	\$24,458,514.98	0%	0%	\$24,458,515	P Previous Work	Developed by Anchor QEA (2010)			
															TOTAL UNIT COST:		\$57,287,550			
Notes:																				
HTRW productivity factor is from Exhibit B-3 or B-4 of "A Guide to Developing and Documenting Cost Estimates During the Feasibility Study", EPA 2000																				
The Cost Database Code is a reference code for linking with line item cost information with the cost source database and is not otherwise used within these cost worksheets.																				
Source of Cost Data:																				
NA Not Applicable - costs are from previous work or vendor quote																				
For citation references, the following sources apply:																				
MII (MII Assemblies), GSA (www.gsa.gov), FLC (www.flcdatcenter.com), A (Allowance), V (Vendor Quote), CW (Means CostWorks 2015), P (Previous Work), and FRTR (www.frtr.gov)																				
Cost Adjustment Checklist:																				
FACTOR:																				
H&S Productivity (labor and equipment only)																				
Escalation to Base Year																				
Area Cost Factor																				
Subcontractor Overhead and Profit																				
Prime Contractor Overhead and Profit																				
NOTES:																				
Field work will be in Level "D" PPE.																				
MII assembly costs include HPF adjustments.																				
2015 cost sources are not escalated (EF=1.00). All other costs are escalated based on the USACE CWCCIS, EM 1110-2-1304, Mar 2015.																				
An AF of 1.05 is used for Oregon, except that an AF of 1.00 (national unmodified average) is used for MII assembly costs and local vendor quotes.																				
It is assumed that home office OH is 8% and profit is 9% for the Prime Contractor. Professional labor overhead is 100%. Allowances and items with mandated costs such as per diem do not have overhead and profit applied.																				
Items previously developed by Anchor QEA (2010) already include contractor markups, therefore overhead and profit were not applied to those items.																				
It is assumed that OH is 1% and profit is 0% for vendor quotes for treatment and disposal at offsite disposal facilities. It is assumed that OH is 5% and profit is 0% for quotes for all other material vendor quotes.																				
Abbreviations:																				
QTY Quantity																				
EQUIP Equipment																				
MATL Material																				
HPF HTRW Productivity Factor																				
ADJ LABOR Adjusted Labor for HFP																				
ADJ EQUIP Adjusted Equipment for HFP																				
UNMOD UC Unmodified Unit Cost																				
UNMOD LIC Unmodified Line Item Cost																				
UNBUR LIC Unburdened Line Item Cost																				
PC OH Prime Contractor Overhead																				
PC PF Prime Contractor Profit																				
BUR LIC Burdened Line Item Cost																				
ACR Acres																				
BCY Bank Cubic Yard																				
CLF 100 Linear Foot																				
DY Days																				
EA Each																				
LF Linear Foot																				
HR Hours																				
LB Pounds																				
LCY Loose Cubic Yard																				
LS Lump Sum																				
RL Roll																				
SY Square Yard																				
TN Tons																				

TABLE CW-G25

**Alternative G**                      **Cost Worksheet: CW-G25**  
**Capital Cost Sub-Element**  
**Long-Term Maintenance for Capping, EMNR, and In Situ Treatment**

**COST WORKSHEET**

<b>Site:</b>	Portland Harbor Superfund Site	<b>Prepared By:</b>	AB	<b>Date:</b>	8/11/2015
<b>Location:</b>	Portland, Oregon				
<b>Phase:</b>	Draft Feasibility Study	<b>Checked By:</b>	JN	<b>Date:</b>	8/12/2015
<b>Base Year:</b>	2015				

**Work Statement:**  
This sub-element involves replacement of 5% of the technology assignment layers as part of long-term maintenance. It includes costs for on-site labor, equipment, and materials developed from previous work.

**Cost Analysis:**  
Cost for Long-Term Maintenance (Lump Sum)

COST DATABASE CODE	DESCRIPTION	QTY	UNIT(S)	HPF	LABOR	ADJ LABOR	EQUIP	ADJ EQUIP	MATL	OTHER	UNMOD UC	UNMOD LIC	PC OH	PC PF	BUR LIC	COST SOURCE CITATION	COMMENTS
<b>Mobilization / Demobilization</b>																	
M16	Mobilization/Demobilization for Long Term Maintenance	1	LS	1.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$263,036.82	\$263,036.82	\$263,036.82	0%	0%	\$263,037	A Previous Work	Assumes 1.6% of total capital costs per Lower Duwamish. See Calculations for derivation.
<b>Sand Placement for Technology Assignments</b>																	
<b>Sand Placement (Riverbanks)</b>																	
P2	Sand Placement (Confined)	3,471	LCY	1.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$49.01	\$49.01	\$170,096.36	0%	0%	\$170,096	P Previous Work	Assume 5% of placement of additional material
M1	Sand	3,471	LCY	1.00	\$0.00	\$0.00	\$0.00	\$0.00	\$19.71	\$0.00	\$19.71	\$68,413.41	0%	0%	\$68,413	P Previous Work	Assume 5% of placement of additional material
<b>Sand Placement (Confined)</b>																	
P2	Sand Placement (Confined)	8,110	LCY	1.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$49.01	\$49.01	\$397,430.55	0%	0%	\$397,431	P Previous Work	Assume 5% of placement of additional material
M1	Sand	8,110	LCY	1.00	\$0.00	\$0.00	\$0.00	\$0.00	\$19.71	\$0.00	\$19.71	\$159,848.10	0%	0%	\$159,848	P Previous Work	Assume 5% of placement of additional material
<b>Sand Placement (Open Water)</b>																	
P6	Sand Placement (Open Water)	93,421	LCY	1.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$23.76	\$23.76	\$2,219,682.96	0%	0%	\$2,219,683	P Previous Work	Assume 5% of placement of additional material
M1	Sand	93,421	LCY	1.00	\$0.00	\$0.00	\$0.00	\$0.00	\$19.71	\$0.00	\$19.71	\$1,841,327.91	0%	0%	\$1,841,328	P Previous Work	Assume 5% of placement of additional material
<b>Beach Mix Placement for Technology Assignments</b>																	
<b>Beach Mix Placement (Riverbanks)</b>																	
P5	Beach Mix Placement (Confined)	601	LCY	1.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$58.50	\$58.50	\$35,158.50	0%	0%	\$35,159	P Previous Work	Assume 5% of placement of additional material
M5	ODOT 100 Beach Mix	601	LCY	1.00	\$0.00	\$0.00	\$0.00	\$0.00	\$57.59	\$0.00	\$57.59	\$34,611.59	0%	0%	\$34,612	P Previous Work	Assume 5% of placement of additional material
<b>Beach Mix Placement (Confined)</b>																	
P5	Beach Mix Placement (Confined)	235	LCY	1.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$58.50	\$58.50	\$13,747.50	0%	0%	\$13,748	P Previous Work	Assume 5% of placement of additional material
M5	ODOT 100 Beach Mix	235	LCY	1.00	\$0.00	\$0.00	\$0.00	\$0.00	\$57.59	\$0.00	\$57.59	\$13,533.65	0%	0%	\$13,534	P Previous Work	Assume 5% of placement of additional material
<b>Beach Mix Placement (Open Water)</b>																	
P39	Beach Mix Placement (Open Water)	2,710	LCY	1.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$28.34	\$28.34	\$76,798.01	0%	0%	\$76,798	P Previous Work	Assume 5% of placement of additional material
M5	ODOT 100 Beach Mix	2,710	LCY	1.00	\$0.00	\$0.00	\$0.00	\$0.00	\$57.59	\$0.00	\$57.59	\$156,068.90	0%	0%	\$156,069	P Previous Work	Assume 5% of placement of additional material
<b>Armor Placement for Technology Assignments</b>																	
<b>Armor Placement (Riverbanks)</b>																	
P3	ODOT 200 Placement (Confined)	597	LCY	1.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$58.50	\$58.50	\$34,924.50	0%	0%	\$34,925	P Previous Work	Assume 5% of placement of additional material
M2	ODOT 200 Armor	597	LCY	1.00	\$0.00	\$0.00	\$0.00	\$0.00	\$57.59	\$0.00	\$57.59	\$34,381.23	0%	0%	\$34,381	P Previous Work	Assume 5% of placement of additional material
<b>Armor Placement (Confined)</b>																	
P3	ODOT 200 Placement (Confined)	2,206	LCY	1.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$58.50	\$58.50	\$129,051.00	0%	0%	\$129,051	P Previous Work	Assume 5% of placement of additional material
M2	ODOT 200 Armor	2,206	LCY	1.00	\$0.00	\$0.00	\$0.00	\$0.00	\$57.59	\$0.00	\$57.59	\$127,043.54	0%	0%	\$127,044	P Previous Work	Assume 5% of placement of additional material
<b>Armor Placement (Open Water)</b>																	
P7	ODOT 200 Placement (Open Water)	10,334	LCY	1.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$28.34	\$28.34	\$292,852.64	0%	0%	\$292,853	P Previous Work	Assume 5% of placement of additional material
M2	ODOT 200 Armor	10,334	LCY	1.00	\$0.00	\$0.00	\$0.00	\$0.00	\$57.59	\$0.00	\$57.59	\$595,135.06	0%	0%	\$595,135	P Previous Work	Assume 5% of placement of additional material
<b>Reactive/GAC Placement for Technology Assignments</b>																	
<b>Reactive/GAC Placement (Riverbanks)</b>																	
P40	Carbon (AquaGate + PAC 5%) Placement (Confined)	62	TON	1.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$816.75	\$816.75	\$50,638.50	0%	0%	\$50,639	P Previous Work	Assume 5% of placement of additional material
M4	Carbon (AquaGate + PAC 5%)	62	TON	1.00	\$0.00	\$0.00	\$0.00	\$0.00	\$8,000.00	\$0.00	\$8,000.00	\$496,000.00	5%	0%	\$520,800	V Vendor Quote	Assume 5% of placement of additional material
<b>Reactive/GAC Placement (Confined)</b>																	
P40	Carbon (AquaGate + PAC 5%) Placement (Confined)	94	TON	1.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$816.75	\$816.75	\$76,774.50	0%	0%	\$76,775	P Previous Work	Assume 5% of placement of additional material
M4	Carbon (AquaGate + PAC 5%)	94	TON	1.00	\$0.00	\$0.00	\$0.00	\$0.00	\$8,000.00	\$0.00	\$8,000.00	\$752,000.00	5%	0%	\$789,600	V Vendor Quote	Assume 5% of placement of additional material

TABLE CW-G25

Alternative G Cost Worksheet: CW-G25

Capital Cost Sub-Element

Long-Term Maintenance for Capping, EMNR, and In Situ Treatment

## COST WORKSHEET

Site: Portland Harbor Superfund Site  
 Location: Portland, Oregon  
 Phase: Draft Feasibility Study  
 Base Year: 2015

Prepared By: AB Date: 8/11/2015

Checked By: JN Date: 8/12/2015

**Work Statement:**

This sub-element involves replacement of 5% of the technology assignment layers as part of long-term maintenance. It includes costs for on-site labor, equipment, and materials developed from previous work.

**Cost Analysis:**

Cost for Long-Term Maintenance (Lump Sum)

COST DATABASE CODE	DESCRIPTION	QTY	UNIT(S)	HPF	LABOR	ADJ LABOR	EQUIP	ADJ EQUIP	MATL	OTHER	UNMOD UC	UNMOD LIC	PC OH	PC PF	BUR LIC	COST SOURCE CITATION	COMMENTS
	Reactive/GAC Placement (Open Water)																
P41	Carbon (AquaGate + PAC 5%) Placement (Open Water)	922	TON	1.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$396.00	\$396.00	\$365,112.00	0%	0%	\$365,112	P Previous Work	Assume 5% of placement of additional material
M4	Carbon (AquaGate + PAC 5%)	922	TON	1.00	\$0.00	\$0.00	\$0.00	\$0.00	\$8,000.00	\$0.00	\$8,000.00	\$7,376,000.00	5%	0%	\$7,744,800	V Vendor Quote	Assume 5% of placement of additional material
	<b>Geofabric for Riverbanks</b>																
P51	Geotextile Installation	1.3	AC	1.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$7,060.20	\$7,060.20	\$9,178.27	8%	9%	\$10,805	P Previous Work	Assume 5% of placement of additional material
M13	Geotextile	1.3	AC	1.00	\$0.00	\$0.00	\$0.00	\$0.00	\$5,687.39	\$0.00	\$5,687.39	\$7,393.61	5%	0%	\$7,763	V Vendor Quote	Assume 5% of placement of additional material
	<b>Organoclay Mat Placement for Technology Assignments</b>																
	<b>Organoclay Mat Placement (Riverbanks)</b>																
P23	(Confined)	2,178	SF	1.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$23.74	\$23.74	\$51,700.28	0%	0%	\$51,700	P Previous Work	Assume 5% of placement of additional material
	<b>Organoclay Mat Placement (Confined)</b>																
P23	(Confined)	6,970	SF	1.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$23.74	\$23.74	\$165,450.38	0%	0%	\$165,450	P Previous Work	Assume 5% of placement of additional material
	<b>Organoclay Mat Placement (Open Water)</b>																
P24	Organoclay Mat Material and Placement (Open)	36,155	SF	1.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$7.09	\$7.09	\$256,248.56	0%	0%	\$256,249	P Previous Work	Assume 5% of placement of additional material
<b>TOTAL UNIT COST:</b>															<b>\$16,702,838</b>		

**Notes:**

HTRW productivity factor is from Exhibit B-3 or B-4 of "A Guide to Developing and Documenting Cost Estimates During the Feasibility Study", EPA 2000

The Cost Database Code is a reference code for linking with line item cost information with the cost source database and is not otherwise used within these cost worksheets.

**Source of Cost Data:**

NA Not Applicable - costs are from previous work or vendor quote

For citation references, the following sources apply:

MII (MII Assemblies), GSA (www.gsa.gov), FLC (www.flcdatcenter.com), A (Allowance), V (Vendor Quote), CW (Means CostWorks 2015), P (Previous Work), and FRTR (www.frtr.gov)

**Cost Adjustment Checklist:****FACTOR:**

H&S Productivity (labor and equipment only)

Escalation to Base Year

Area Cost Factor

Subcontractor Overhead and Profit

Prime Contractor Overhead and Profit

**NOTES:**

Field work will be in Level "D" PPE.

MII assembly costs include HPF adjustments.

2015 cost sources are not escalated (EF=1.00). All other costs are escalated based on the USACE CWCCIS, EM 1110-2-1304, Mar 2015.

An AF of 1.05 is used for Oregon, except that an AF of 1.00 (national unmodified average) is used for MII assembly costs and local vendor quotes.

It is assumed that home office OH is 8% and profit is 9% for the Prime Contractor. Professional labor overhead is 100%. Allowances and items with mandated costs such as per diem do not have overhead and profit applied.

Items previously developed by Anchor QEA (2010) already include contractor markups, therefore overhead and profit were not applied to those items.

It is assumed that OH is 1% and profit is 0% for vendor quotes for treatment and disposal at offsite disposal facilities. It is assumed that OH is 5% and profit is 0% for quotes for all other material vendor quotes.

**Abbreviations:**

QTY	Quantity	ACR	Acres
EQUIP	Equipment	BCY	Bank Cubic Yard
MATL	Material	CLF	100 Linear Foot
HPF	HTRW Productivity Factor	DY	Days
ADJ LABOR	Adjusted Labor for HFP	EA	Each
ADJ EQUIP	Adjusted Equipment for HFP	LF	Linear Foot
UNMOD UC	Unmodified Unit Cost	HR	Hours
UNMOD LIC	Unmodified Line Item Cost	LB	Pounds
UNBUR LIC	Unburdened Line Item Cost	LCY	Loose Cubic Yard
PC OH	Prime Contractor Overhead	LS	Lump Sum
PC PF	Prime Contractor Profit	RL	Roll
BUR LIC	Burdened Line Item Cost	SY	Square Yard
		TN	Tons

TABLE CW-G26

**Alternative G**  
**Capital Cost Sub-Element**  
**5-Year Site Review**

**Cost Worksheet: CW-G26**

# **COST WORKSHEET**

**Site:** Portland Harbor Superfund Site  
**Location:** Portland, Oregon  
**Phase:** Draft Feasibility Study  
**Base Year:** 2015

**Prepared By:** JN      **Date:** 7/27/2015

**Checked By:** AS      **Date:** 7/28/2015

**Work Statement:**

This sub-element involves the site visit and 5-year site review report. The following cost includes labor, material and shipping costs for site visits and 5-year site review reports.

**Cost Analysis:**

Cost for 5-Year Site Review (Lump Sum)

COST DATABASE CODE	DESCRIPTION	QTY	UNIT(S)	HPF	LABOR	ADJ LABOR	EQUIP	ADJ EQUIP	MATL	OTHER	UNMOD UC	UNMOD LIC	PC OH	PC PF	BUR LIC	COST SOURCE CITATION	COMMENTS
L11	Project Manager	300	HR	1.00	\$82.17	\$82.17	\$0.00	\$0.00	\$0.00	\$0.00	\$82.17	\$24,651.00	100%	9%	\$53,739	FLC FLCDataCenter	
L4	Environmental Engineer	600	HR	1.00	\$48.91	\$48.91	\$0.00	\$0.00	\$0.00	\$0.00	\$48.91	\$29,346.00	100%	9%	\$63,974	FLC FLCDataCenter	
L6	Environmental Scientist	900	HR	1.00	\$37.70	\$37.70	\$0.00	\$0.00	\$0.00	\$0.00	\$37.70	\$33,930.00	100%	9%	\$73,967	FLC FLCDataCenter	
L12	Quality Control Engineer	120	HR	1.00	\$64.99	\$64.99	\$0.00	\$0.00	\$0.00	\$0.00	\$64.99	\$7,798.80	100%	9%	\$17,001	FLC FLCDataCenter	
L1	CAD Drafter	300	HR	1.00	\$31.31	\$31.31	\$0.00	\$0.00	\$0.00	\$0.00	\$31.31	\$9,393.00	100%	9%	\$20,477	FLC FLCDataCenter	
L3	Clerks, Typist, Bookkeeper & Receptionist	300	HR	1.00	\$19.89	\$19.89	\$0.00	\$0.00	\$0.00	\$0.00	\$19.89	\$5,967.00	100%	9%	\$13,008	FLC FLCDataCenter	
M14	Copy and Shipping Allowance	1	LS	1.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$1,500.00	\$1,500.00	\$1,500.00	0%	0%	\$1,500	A Allowance	
<b>TOTAL UNIT COST:</b>															<b>\$243,666</b>		

**Notes:**

HTRW productivity factor is from Exhibit B-3 or B-4 of "A Guide to Developing and Documenting Cost Estimates During the Feasibility Study", EPA 2000

The Cost Database Code is a reference code for linking with line item cost information with the cost source database and is not otherwise used within these cost worksheets.

**Source of Cost Data:**

NA Not Applicable - costs are from previous work or vendor quote

For citation references, the following sources apply:

MII (MII Assemblies), GSA (www.gsa.gov), FLC (www.flcdatacenter.com), A (Allowance), V (Vendor Quote), CW (Means CostWorks 2015), P (Previous Work), and FRTR (www.frtr.org)

**Cost Adjustment Checklist:**

FACTOR:

H&S Productivity (labor and equipment only)

Escalation to Base Year

Area Cost Factor

Subcontractor Overhead and Profit

Prime Contractor Overhead and Profit

**NOTES:**

Field work will be in Level "D" PPE.

MII assembly costs include HPF adjustments.

2015 cost sources are not escalated (EF=1.00). All other costs are escalated based on the USACE CWCCIS, EM 1110-2-1304, Mar 2015.

An AF of 1.05 is used for Oregon, except that an AF of 1.00 (national unmodified average) is used for MII assembly costs and local vendor quotes.

It is assumed that home office OH is 8% and profit is 9% for the Prime Contractor. Professional labor overhead is 100%. Allowances and items with mandated costs such as per diem do not have overhead and profit applied.

Items previously developed by Anchor QEA (2010) already include contractor markups, therefore overhead and profit were not applied to those items.

It is assumed that OH is 1% and profit is 0% for vendor quotes for treatment and disposal at offsite disposal facilities. It is assumed that OH is 5% and profit is 0% for quotes for all other material vendor quotes.

**Abbreviations:**

QTY	Quantity	ACR	Acres
EQUIP	Equipment	BCY	Bank Cubic Yard
MATL	Material	CLF	100 Linear Foot
HPF	HTRW Productivity Factor	DY	Days
ADJ LABOR	Adjusted Labor for HFP	EA	Each
ADJ EQUIP	Adjusted Equipment for HFP	LF	Linear Foot
UNMOD UC	Unmodified Unit Cost	HR	Hours
UNMOD LIC	Unmodified Line Item Cost	LB	Pounds
UNBUR LIC	Unburdened Line Item Cost	LCY	Loose Cubic Yard
PC OH	Prime Contractor Overhead	LS	Lump Sum
PC PF	Prime Contractor Profit	RL	Roll
BUR LIC	Burdened Line Item Cost	SY	Square Yard
		TN	Tons

## Calculations



PROJECT: Portland Harbor FS  
 JOB NO.: 79171.3383.345.FSZ  
 CLIENT: EPA

COMPUTED BY: AB  
 DATE: 8/11/2015  
 CHECKED BY: JN  
 WRKSHT NO.: QTY-01

Technology Name	Area (ACR)				
	Alt. B	Alt. D	Alt. E	Alt. F	Alt. G
Broadcast GAC	6.77	3.27	0.03	0.03	0.01
Engineered cap (3ft)	0.91	3.96	4.79	13.25	23.57
Cap with armoring (3ft)	2.75	8.91	13.56	47.72	100.85
Reactive armored cap (3ft)	5.52	9.58	15.46	28.76	38.66
Reactive cap (3ft)	0.00	0.00	0.00	0.00	0.00
Dredge with backfill	1.69	4.30	4.07	11.46	19.38
Dredge with engineered cap (3ft)	0.00	2.56	3.36	13.97	25.04
Dredge with reactive armored cap (3ft)	2.53	5.22	8.67	14.69	15.96
Dredge with reactive cap (3ft)	0.00	0.00	0.00	0.00	0.00
Dredge with reactive cap (3ft)	0.50	1.08	1.79	5.29	8.69
Dredge with residual layer (1ft)	19.31	44.43	60.14	209.08	356.75
Dredge with reactive residual layer (1ft)	46.70	79.45	132.58	147.90	169.41
Dredge with reactive residual layer (1ft)	8.27	11.91	22.12	17.88	18.49
Dredge with significantly augmented reactive cap (3ft)	0.84	1.17	1.63	2.20	2.34
Dredge with significantly augmented reactive cap (3ft)	1.00	1.14	1.38	1.42	1.42
EMNR in Swan Island	103.10	87.70	59.49	23.83	14.52
Monitored Natural Recovery	2425.22	2367.22	2312.41	2105.80	1848.58
MNR - No tech assigned	18.64	11.86	2.27	0.47	0.10
Previously remediated	23.16	23.16	23.16	23.16	23.16
<b>Total Acres</b>	<b>2,667</b>	<b>2,667</b>	<b>2,667</b>	<b>2,667</b>	<b>2,667</b>
<b>Active Acres</b>	<b>200</b>	<b>265</b>	<b>329</b>	<b>537</b>	<b>795</b>

Note: All acres "neat" with no overage allowance

Note: For calculated Backfill Quantities, in place and excavated volumes are assumed to be similar because the excavated material will be in a somewhat loose state following dredging. Additionally, the added weight of dewatering agent (DE) is offset by the weight of the water loss, and no net change is assumed in the dredge volume from the densification during dewatering.

### Monitoring Areas (AC)

Total Area for Cap Monitoring	73	130	212	303	417
Porewater Reactive Layer Monitoring	83	126	200	238	275
MNR/EMNR/Broadcast GAC	2,554	2,471	2,375	2,131	1,864

### Mitigation Quantities for Confined Dredge and Riverbank Areas (AC)

Armored Cap Areas (including reactive armored caps):	10.9	23.8	37.7	91.2	155.5
Riverbank Armored Cap Areas (including reactive armored caps):	2.8	3.5	4.7	6.8	7.4
<b>Total Mitigation Area (AC)</b>	<b>13.7</b>	<b>27.3</b>	<b>42.4</b>	<b>98.0</b>	<b>162.9</b>





PROJECT: Portland Harbor FS  
 JOB NO.: 79171.3383.345.FSZ  
 CLIENT: EPA

COMPUTED BY: ARB  
 DATE: 8/7/2015  
 CHECKED BY: AIS  
 WRKSHT NO.: QTY-02

Technology Name	Dredged Volumes (CY)				
	Alt. B	Alt. D	Alt. E	Alt. F	Alt. G
Broadcast GAC	-	-	-	-	-
Engineered cap (3ft)	-	-	-	-	-
Cap with armoring (3ft)	-	-	-	-	-
Reactive armored cap (3ft)	-	-	-	-	-
Reactive cap (3ft)	-	-	-	-	-
Dredge with backfill	7,967	15,608	18,415	57,551	89,715
Dredge with engineered cap (3ft)	-	12,367	16,267	67,622	121,211
Dredge with reactive armored cap (3ft)	12,256	25,278	41,956	71,111	77,233
Dredge with reactive cap (3ft)	-	-	-	-	-
Dredge with reactive cap (3ft)	2,411	5,222	8,656	25,611	42,067
Dredge with residual layer (1ft)	42,830	114,343	199,733	1,269,391	2,510,387
Dredge with reactive residual layer (1ft)	251,283	481,876	890,343	1,226,530	1,524,554
Dredge with reactive residual layer (1ft)	48,226	71,366	125,892	116,208	120,777
Dredge with significantly augmented reactive cap (3ft)	20,222	28,222	39,556	53,333	56,556
Dredge with significantly augmented reactive cap (3ft)	24,222	27,667	33,444	34,333	34,333
EMNR in Swan Island	-	-	-	-	-
Monitored Natural Recovery	-	-	-	-	-
MNR - No tech assigned	-	-	-	-	-
Previously remediated	0	0	0	0	0
<b>Total CY Dredged</b>	<b>409,416</b>	<b>781,949</b>	<b>1,374,260</b>	<b>2,921,691</b>	<b>4,576,831</b>

Note: All volumes "neat" with no overdredge allowance

### Dredge Volumes (CY)

Low Volume with Overdredge	614,125	1,172,924	2,061,390	4,382,536	6,865,247
High Volume with Overdredge	818,833	1,563,898	2,748,520	5,843,381	9,153,663
<b>Average Total Volume Dredged</b>	<b>716,479</b>	<b>1,368,411</b>	<b>2,404,955</b>	<b>5,112,959</b>	<b>8,009,455</b>
Total CY Dredged (Open Water) Neat	326,590	649,719	1,171,586	2,620,365	4,168,729
Low Volume with Overdredge (Open Water)	489,886	974,579	1,757,380	3,930,548	6,253,094
High Volume with Overdredge (Open Water)	653,181	1,299,439	2,343,173	5,240,731	8,337,458
<b>Open Water Dredge Volume (CY)</b>	<b>571,534</b>	<b>1,137,009</b>	<b>2,050,277</b>	<b>4,585,640</b>	<b>7,295,277</b>
Total CY Dredged (Confined) Neat	82,826	132,230	202,674	301,325	408,102
Low Volume with Overdredge (Confined)	124,239	198,344	304,011	451,988	612,153
High Volume with Overdredge (Confined)	165,652	264,459	405,348	602,651	816,204
<b>Confined Dredge Volume (CY)</b>	<b>144,946</b>	<b>231,402</b>	<b>354,680</b>	<b>527,320</b>	<b>714,179</b>
<b>Riverbank Excavate/Dredge from Shore Volume (CY)</b>	<b>52,758</b>	<b>72,643</b>	<b>89,212</b>	<b>108,059</b>	<b>123,581</b>



PROJECT: Portland Harbor FS  
 JOB NO.: 79171.3383.345.FSZ  
 CLIENT: EPA

COMPUTED BY: ARB  
 DATE: 8/7/2015  
 CHECKED BY: AIS  
 WRKSH NO.: QTY-02

## Disposal Volumes (CY)

For cost purposes, Not Reliably Contained PTW (NAPL and material requiring ex situ treatment) will be disposed at Subtitle C facility with Ex Situ Treatment, and everything else will be disposed at a Subtitle D facility or CDF)

### PTW Volumes for Disposal (CY)

Alt	PTW - NRC.NAPL	PTW - Conc
B	160,561	180,695
C	176,658	237,023
D	197,528	368,519
E	215,782	802,538
F	247,916	1,013,196
G	259,006	1,090,806

Note: All volumes "neat" with no overdredge allowance

### Disposal Volumes (CY)

	Alt. B	Alt. D	Alt. E	Alt. F	Alt. G
ptw.nrc.napl.cy (neat)	160,561	197,528	215,782	247,916	259,006
Low Volume with Overdredge	240,842	296,292	323,672	371,873	388,509
High Volume with Overdredge	321,122.02	395,056	431,563	495,831	518,012
<b>NRC PTW Dredged for Subtitle C Disposal with Ex Situ Treatment (Not Including Riverbanks)</b>	<b>280,982</b>	<b>345,675</b>	<b>377,618</b>	<b>433,853</b>	<b>453,261</b>

<b>PTW from Riverbank Excavation for Subtitle C Disposal with Ex Situ Treatment</b>	<b>9,939</b>	<b>9,958</b>	<b>9,966</b>	<b>9,966</b>	<b>9,966</b>
---	--------------	--------------	--------------	--------------	--------------

<b>Total NRC PTW Dredged for Subtitle C Disposal with Ex Situ Treatment</b>	<b>290,921</b>	<b>355,633</b>	<b>387,584</b>	<b>443,819</b>	<b>463,227</b>
---	----------------	----------------	----------------	----------------	----------------

<b>Volume of Riverbanks for Subtitle D, CY:</b>	<b>42,819</b>	<b>62,685</b>	<b>79,246</b>	<b>98,093</b>	<b>113,615</b>
---	---------------	---------------	---------------	---------------	----------------

<b>Total Dredge for Subtitle D Disposal</b>	<b>478,317</b>	<b>1,085,421</b>	<b>2,106,585</b>	<b>4,777,200</b>	<b>7,669,810</b>
---	----------------	------------------	------------------	------------------	------------------

## Volumes for DMM Scenario 1 (CDF Option) Analysis

<b>Volume of Dredge Sediments for Subtitle D or CDF Disposal (including Riverbanks):</b>	<b>478,317</b>	<b>1,085,421</b>	<b>2,106,585</b>	<b>4,777,200</b>	<b>7,669,810</b>
--	----------------	------------------	------------------	------------------	------------------

<b>Total Dredge for CDF Disposal</b>	<b>-</b>	<b>-</b>	<b>670,000</b>	<b>670,000</b>	<b>670,000</b>
--------------------------------------	----------	----------	----------------	----------------	----------------

<b>Total Dredge for Subtitle D Disposal</b>	<b>478,317</b>	<b>1,085,421</b>	<b>1,436,585</b>	<b>4,107,200</b>	<b>6,999,810</b>
---	----------------	------------------	------------------	------------------	------------------



PROJECT: Portland Harbor FS  
JOB NO.: 79171.3383.345.FSZ  
CLIENT: EPA

COMPUTED BY: ARB  
DATE: 8/7/2015  
CHECKED BY: AIS  
WRKSHT NO.: QTY-02

### **Volumes for Subtitle C Disposal Sensitivity Analysis**

Percent Increase and Decrease of the Not Reliably Contained PTW  
(NAPL) Volume for Sensitivity Analysis: 15%

#### **High Quantity Estimate**

Disposal Volumes (CY)					
	Alt. B	Alt. D	Alt. E	Alt. F	Alt. G
Total PTW NRC NAPL Dredged for Subtitle C Disposal with Ex Situ Treatment	334,560	408,978	445,722	510,392	532,712
Volume of Dredge Sediments for Subtitle D Disposal (including Riverbanks):	434,678	1,032,076	2,048,447	4,710,627	7,600,325

#### **Low Quantity Estimate**

Total PTW NRC NAPL Dredged for Subtitle C Disposal with Ex Situ Treatment	247,283	302,289	329,447	377,247	393,743
Volume of Dredge Sediments for Subtitle D Disposal (including Riverbanks):	521,955	1,138,765	2,164,722	4,843,772	7,739,294



PROJECT: Portland Harbor FS  
 JOB NO.: 79171.3383.345.FSZ  
 CLIENT: EPA

COMPUTED BY: ARB  
 DATE: 8/11/2015  
 CHECKED BY: JN  
 WRKSHT NO.: QTY-05

### GIS Riverbank Estimate Assumptions (7/20/2015)

- Contaminated riverbanks are pre-determined areas defined as lines along the outer limits of the site boundary and are estimated locations only.
- Riverbank technology assignment was assumed to be the same as the nearshore technology assignment.
  - A parallel line 20 ft interior of the riverbank lines was used to estimate technology assignments
  - The parallel line was intersected with the technology assignments at each alternative B through G.
- Based on this intersection some rough linear estimates were given in the following table.

Technology Name	Length of Riverbank by Tech Assignment (FT)				
	Alt. B	Alt. D	Alt. E	Alt. F	Alt. G
Cap with armoring (3ft)		40	40	97	486
Reactive armored cap (3ft)	687	852	894	1,230	1,278
Dredge with backfill		1,159	1,159	1,376	2,496
Dredge with engineered cap (3ft)				454	951
Dredge with reactive armored cap (3ft)	1,832	2,202	3,278	4,773	4,893
Dredge with reactive cap (3ft)	496	667	869	1,587	2,278
Dredge with residual layer (1ft)				239	239
Dredge with reactive residual layer (1ft)	913	1,228	1,835	2,302	2,304
Dredge with reactive residual layer (1ft)	5,010	6,281	7,083	6,687	6,886
Dredge with significantly augmented reactive cap (3ft)	687	770	889	889	889
EMNR in Swan Island	1,742	1,259	921	780	83
Monitored Natural Recovery	14,465	11,374	8,862	5,418	3,049
Previously remediated	309	310	310	310	310
<b>Grand Total</b>	<b>26,141</b>	<b>26,141</b>	<b>26,141</b>	<b>26,141</b>	<b>26,141</b>

Note: No action will be taken for the areas designated EMNR/MNR because it is not considered to be in an SMA

### PTW Estimate Assumptions (7/20/2015)

- The parallel riverbank lines from above were intersected with each of the three types of PTW.
- Not reliably contained PTW was not found within 20 ft of the riverbank areas and no values were obtained. The others are shown in the table below.
- NAPL is the only PTW assumed to be treated and the only one used for calculations

	Length of Riverbank Identified as PTW Dredged (FT)				
	PTW -- Highly Toxic	PTW -- NAPL	PTW -- Not Reliably Contained	PTW -- Total Dredged*	
PTW -- Highly Toxic	6,597	8,663	11,233	12,056	12,056
PTW -- NAPL	1,684	1,687	1,688	1,688	1,688
PTW -- Not Reliably Contained	-	-	-	-	-
<b>PTW -- Total Dredged*</b>	<b>8,280</b>	<b>10,350</b>	<b>12,921</b>	<b>13,744</b>	<b>13,745</b>

\*This value is not a sum but the two types of PTW do not overlap at the riverbank

### Riverbank Volumes for Dredge-Disposal

Note: Bank volumes and areas are based on linear feet and the simplified assumptions listed below:

Assumed Bank Slope = 1 V 3 H  
 Assumed Bank Height, ft = 15  
 Horizontal (plan) distance, ft = 45  
 Hypotenuse length, ft = 47.4  
 Average depth, ft = 3  
 Common Earth Conversion from BCY to LCY: 1.12 Means Heavy Construction Handbook



PROJECT: Portland Harbor FS  
 JOB NO.: 79171.3383.345.FSZ  
 CLIENT: EPA

COMPUTED BY: ARB  
 DATE: 8/11/2015  
 CHECKED BY: JN  
 WRKSHT NO.: QTY-05

### Riverbank Volumes for Dredge-Disposal

Riverbank to be Excavated (LF)	8,938	12,306	15,113	18,306	20,935
Volume Excavated (BCY)	47,105	64,860	79,653	96,481	110,340
<b>Excavated Volume for Riverbanks (LCY):</b>	<b>52,758</b>	<b>72,643</b>	<b>89,212</b>	<b>108,059</b>	<b>123,581</b>

PTW-NAPL to be Excavated (LF)	1,684	1,687	1,688	1,688	1,688
Volume Excavated (BCY)	8,874	8,891	8,898	8,898	8,898
<b>Riverbank Volume for Subtitle C Disposal (LCY):</b>	<b>9,939</b>	<b>9,958</b>	<b>9,966</b>	<b>9,966</b>	<b>9,966</b>

<b>Riverbank Volume for Subtitle D or CDF Disposal, CY:</b>	<b>42,819</b>	<b>62,685</b>	<b>79,246</b>	<b>98,093</b>	<b>113,615</b>
---	---------------	---------------	---------------	---------------	----------------

### Riverbank Areas for Capping (AC)

Technology Name	Alt. B	Alt. D	Alt. E	Alt. F	Alt. G
Cap with armoring (3ft)	0	0.1	0.1	0.2	0.6
Reactive armored cap (3ft)	0.8	1	1	1.4	1.4
Dredge with backfill	0	1.3	1.3	1.5	2.8
Dredge with engineered cap (3ft)	0	0	0	0.5	1.1
Dredge with reactive armored cap (3ft)	2	2.4	3.6	5.2	5.4
Dredge with reactive cap (3ft)	0.6	0.8	1	1.8	2.5
Dredge with residual layer (1ft)	0	0	0	0.3	0.3
Dredge with reactive residual layer (1ft)	1	1.4	2	2.6	2.6
Dredge with reactive residual layer (1ft)	5.5	6.9	7.8	7.3	7.5
Dredge with significantly augmented reactive cap (3ft)	0.8	0.9	1	1	1

### Riverbank Backfill and Cap Volumes (CY)

Technology Name	Alt. B	Alt. D	Alt. E	Alt. F	Alt. G
<b>Backfill - 3 ft Dredge Volume minus 1ft Cap Volume</b>					
Dredge with backfill	-	4,074	4,074	4,834	8,771
Dredge with residual layer (1ft)	-	-	-	840	840
Dredge with reactive residual layer (1ft)	3,207	4,315	6,449	8,090	8,096
Dredge with reactive residual layer (1ft)	17,603	22,069	24,886	23,495	24,194

<b>Engineered Cap in Confined Areas</b>					
Riverbank Area (AC)	-	-	-	0.5	1.1
Sand Layer (LCY)	0	0	0	807	1,775
Beachmix (LCY)	0	0	0	403	887

<b>Armored Cap in Open Water Areas</b>					
Riverbank Area (AC)	0.0	0.1	0.1	0.2	0.6
Sand Layer (LCY)	0	323	323	645	1,936
Armor (LCY)	0	161	161	323	968

<b>Reactive Cap with Beachmix for Confined Areas</b>					
Riverbank Area (AC)	0.6	0.8	1.0	1.8	2.5
Riverbank Reactive Layer (LCY)	968	1,291	1,613	2,904	4,033
Riverbank Carbon within Reactive Layer (TON)	48	64	80	143	199
Riverbank Sand within Reactive Layer (LCY)	36	48	60	109	151
Riverbank Sand Layer (LCY)	1,452	1,936	2,420	4,356	6,050
Beachmix (LCY)	484	645	807	1,452	2,017



PROJECT: Portland Harbor FS  
 JOB NO.: 79171.3383.345.FSZ  
 CLIENT: EPA

COMPUTED BY : ARB  
 DATE : 8/11/2015  
 CHECKED BY :  
 WRKSHT NO. : QTY-05

Reactive Armored Cap in Open Water Areas					
Riverbank Area (AC)	2.8	3.4	4.6	6.6	6.8
Riverbank Reactive Layer (LCY)	4,517	5,485	7,421	10,648	10,971
Riverbank Carbon within Reactive Layer (TON)	223	271	366	526	542
Riverbank Sand within Reactive Layer (LCY)	169	206	278	399	411
Riverbank Sand Layer (LCY)	4,517	5,485	7,421	10,648	10,971
Riverbank Armor (LCY)	4,517	5,485	7,421	10,648	10,971

Residual Layer in Open Water Areas					
Riverbank Area (AC)	0.0	0.0	0.0	0.3	0.3
Riverbank Sand Layer (LCY)	0	0	0	484	484

Reactive Residual Layer in Open Water Areas					
Riverbank Area (AC)	1.0	1.4	2.0	2.6	2.6
Riverbank Reactive Layer (LCY)	1,613	2,259	3,227	4,195	4,195
Riverbank Carbon within Reactive Layer (TON)	80	112	159	207	207
Riverbank Sand within Reactive Layer (LCY)	60	85	121	157	157

Reactive Residual Layer for Confined Areas					
Riverbank Area (AC)	5.5	6.9	7.8	7.3	7.5
Riverbank Reactive Layer (LCY)	4,437	5,566	6,292	5,889	6,050
Riverbank Carbon within Reactive Layer (TON)	219	275	311	291	299
Riverbank Sand within Reactive Layer (LCY)	166	209	236	221	227
Riverbank Beachmix (LCY)	4,437	5,566	6,292	5,889	6,050

Significantly Augmented Reactive Cap in Confined Areas					
Riverbank Area (AC)	0.8	0.9	1.0	1.0	1.0
Low Perm Sand Layer (LCY)	1,183	1,331	1,479	1,479	1,479
Organoclay Mat Layer (AC)	0.8	0.9	1.0	1.0	1.0
Riverbank Sand Layer (LCY)	1,291	1,452	1,613	1,613	1,613
Riverbank Beachmix (LCY)	645	726	807	807	807

Dredge with Backfill Areas in Confined Areas					
Riverbank Area (AC)	0	1.3	1.3	1.5	2.8
Riverbank Sand Layer (LCY)	0	1,049	1,049	1,210	2,259
Riverbank Beachmix (LCY)	0	1,049	1,049	1,210	2,259

### Summary of Riverbank Capping and Backfill Quantities

Sand for Backfill and Capping Riverbanks (LCY)	29,685	42,581	50,409	59,387	69,413
Carbon for Capping Riverbanks (TON)	570	721	916	1,167	1,247
Armor for Capping Riverbanks (LCY)	4,517	5,647	7,583	10,971	11,939
Beachmix for Capping Riverbanks (LCY)	5,566	7,986	8,954	9,761	12,019
Organoclay Mat Layer for Riverbanks (AC)	0.80	0.90	1.00	1.00	1.00
Geofabric for Riverbanks (AC)	10.70	14.80	17.80	21.80	25.20



PROJECT: Portland Harbor FS  
 JOB NO.: 79171.3383.345.FSZ  
 CLIENT: EPA

COMPUTED BY: JN  
 DATE: 7/28/2015  
 CHECKED BY: AIS  
 WRKSHT NO.: QTY-08

## Sand Quantities (CY)

	Alt. B	Alt. C	Alt. D	Alt. E	Alt. F	Alt. G
All Residual	168,683	206,357	293,413	470,122	755,068	1,058,641
All Cap	76,065	104,463	165,846	237,417	579,987	966,428
<b>Total CY</b>	<b>244,748</b>	<b>310,820</b>	<b>459,259</b>	<b>707,539</b>	<b>1,335,055</b>	<b>2,025,069</b>

Open Residual	150,450	182,936	266,379	433,314	715,188	1,013,884
Open Cap	56,550	81,391	133,059	186,217	492,733	852,437
Confined Residual	18,233	23,422	27,034	36,808	39,880	44,757
Confined Cap	19,515	23,072	32,787	51,200	87,254	113,991
<b>Total CY</b>	<b>244,748</b>	<b>310,820</b>	<b>459,259</b>	<b>707,539</b>	<b>1,335,055</b>	<b>2,025,069</b>

	Thickness (in)	
Low Permeability Layer of Significantly Augmented Reactive Cap (Constructed)	11	Add 11" Low Permeability Sand Layer to Significantly Aug. Caps
Reactive/Carbon Layer of Significantly Augmented Reactive Cap (Modeled)	12	.48 lbs/sf-cm Remove 12" Reactive/Carbon Layer to Significantly Aug. Caps

	Alt. B	Alt. C	Alt. D	Alt. E	Alt. F	Alt. G
Area of Significantly Augmented Reactive Cap with BeachMix (AC)	1.00	1.10	1.14	1.38	1.42	1.42
Area of Significantly Augmented Reactive Cap without BeachMix (AC)	0.84	1.02	1.17	1.63	2.20	2.34
Volume of Low Perm Sand in Open Sig Aug Caps (CY)	1480.25	1629.63	1690.74	2043.83	2098.15	2098.15
Volume of Low Perm Sand in Confined Sig Aug Caps (CY)	1235.80	1510.80	1724.69	2417.28	3259.26	3456.17

	Alt. B	Alt. C	Alt. D	Alt. E	Alt. F	Alt. G
All Residual	168,683	206,357	293,413	470,122	755,068	1,058,641
All Cap	78,781	107,603	169,262	241,878	585,344	971,982
<b>Total CY</b>	<b>247,464</b>	<b>313,961</b>	<b>462,675</b>	<b>712,000</b>	<b>1,340,412</b>	<b>2,030,623</b>

Open Residual	150,450	182,936	266,379	433,314	715,188	1,013,884
Open Cap	58,030	83,020	134,750	188,260	494,831	854,535
Confined Residual	18,233	23,422	27,034	36,808	39,880	44,757
Confined Cap	20,751	24,583	34,512	53,617	90,513	117,447
<b>Total CY</b>	<b>247,464</b>	<b>313,961</b>	<b>462,675</b>	<b>712,000</b>	<b>1,340,412</b>	<b>2,030,623</b>

## Sand Quantities

<b>Total Sand Material Quantities (CY):</b>	<b>277,150</b>	<b>348,194</b>	<b>505,256</b>	<b>762,409</b>	<b>1,399,799</b>	<b>2,100,036</b>
<b>Confined Sand Placement (CY):</b>	<b>38,984</b>	<b>48,005</b>	<b>61,546</b>	<b>90,426</b>	<b>130,393</b>	<b>162,204</b>
<b>Open Sand Placement (CY):</b>	<b>208,481</b>	<b>265,956</b>	<b>401,129</b>	<b>621,574</b>	<b>1,210,019</b>	<b>1,868,419</b>
<b>Sand for Backfill and Capping Riverbanks (CY):</b>	<b>29,685</b>	<b>34,233</b>	<b>42,581</b>	<b>50,409</b>	<b>59,387</b>	<b>69,413</b>



PROJECT: Portland Harbor FS  
 JOB NO.: 79171.3383.345.FSZ  
 CLIENT: EPA

COMPUTED BY: JN  
 DATE: 7/28/2015  
 CHECKED BY: AIS  
 WRKSH NO.: QTY-09

### Beachmix Quantities (CY)

	Alt. B	Alt. C	Alt. D	Alt. E	Alt. F	Alt. G
All Residual	8,035	9,500	13,080	21,126	23,669	30,543
All Cap	1,209	2,230	3,854	5,269	16,683	28,357
<b>Total CY</b>	<b>9,244</b>	<b>11,730</b>	<b>16,933</b>	<b>26,394</b>	<b>40,352</b>	<b>58,900</b>

Open Residual	6,617	7,967	11,346	18,372	20,730	26,802
Open Cap	1,150	2,154	3,615	4,935	16,170	27,396
Confined Residual	1,419	1,533	1,733	2,754	2,939	3,741
Confined Cap	59	76	239	333	513	961
<b>Total CY</b>	<b>9,244</b>	<b>11,730</b>	<b>16,933</b>	<b>26,394</b>	<b>40,352</b>	<b>58,900</b>

### Beachmix Quantities

<b>Total Beachmix Material Quantities (CY):</b>	<b>14,811</b>	<b>18,182</b>	<b>24,919</b>	<b>35,348</b>	<b>50,113</b>	<b>70,919</b>
<b>Confined Beachmix Placement (CY):</b>	<b>1,478</b>	<b>1,609</b>	<b>1,972</b>	<b>3,087</b>	<b>3,452</b>	<b>4,702</b>
<b>Open Beachmix Placement (CY):</b>	<b>7,767</b>	<b>10,120</b>	<b>14,961</b>	<b>23,307</b>	<b>36,900</b>	<b>54,198</b>
<b>Beachmix for Capping Riverbanks (CY):</b>	<b>5,566</b>	<b>6,453</b>	<b>7,986</b>	<b>8,954</b>	<b>9,761</b>	<b>12,019</b>





PROJECT: Portland Harbor FS  
 JOB NO.: 79171.3383.345.FSZ  
 CLIENT: EPA

COMPUTED BY: JN  
 DATE: 7/28/2015  
 CHECKED BY: AIS  
 WRKSHT NO.: QTY-10

### Armor Quantities (CY)

	Alt. B	Alt. C	Alt. D	Alt. E	Alt. F	Alt. G
All Cap	17,470	22,819	38,256	60,804	147,096	250,815
Open Cap	9,122	12,944	24,604	40,059	111,063	206,689
Confined Cap	8,348	9,874	13,652	20,744	36,033	44,126

### Armor Quantities

Total Armor Material Quantities (CY):	21,987	27,658	43,903	68,386	158,067	262,754
Confined Armor Placement (CY):	8,348	9,874	13,652	20,744	36,033	44,126
Open Beachmix Placement (CY):	9,122	12,944	24,604	40,059	111,063	206,689
Armor for Capping Riverbanks (CY):	4,517	4,840	5,647	7,583	10,971	11,939



PROJECT: Portland Harbor FS  
 JOB NO.: 79171.3383.345.FSZ  
 CLIENT: EPA

COMPUTED BY: JN  
 DATE: 7/28/2015  
 CHECKED BY: AIS  
 WRKSH T NO.: QTY-11

### Organoclay Mat Quantities (ACR)

	Alt. B	Alt. C	Alt. D	Alt. E	Alt. F	Alt. G
all Residual	12	13	13	14	15	15
all Cap	3	3	4	4	5	5
<b>Total Acres</b>	<b>15</b>	<b>16</b>	<b>17</b>	<b>18</b>	<b>19</b>	<b>20</b>

open Residual	11	11	12	12	13	13
open Cap	2	2	2	3	3	3
confined Residual	2	2	2	1	1	1
confined Cap	1	1	1	2	2	2
<b>Total Acres</b>	<b>15</b>	<b>16</b>	<b>17</b>	<b>18</b>	<b>19</b>	<b>20</b>

### Organoclay Mat Quantities

<b>Total Organoclay Mat Material Quantities (ACR):</b>	<b>16.20</b>	<b>17.00</b>	<b>17.80</b>	<b>18.80</b>	<b>20.50</b>	<b>20.80</b>
<b>Confined Organoclay Mat Placement (ACR):</b>	<b>3.20</b>	<b>3.20</b>	<b>3.20</b>	<b>3.20</b>	<b>3.20</b>	<b>3.20</b>
<b>Open Organoclay Mat Placement (ACR):</b>	<b>12.20</b>	<b>12.90</b>	<b>13.70</b>	<b>14.60</b>	<b>16.30</b>	<b>16.60</b>
<b>Organoclay Mat Layer for Riverbanks (ACR):</b>	<b>0.80</b>	<b>0.90</b>	<b>0.90</b>	<b>1.00</b>	<b>1.00</b>	<b>1.00</b>



PROJECT: Portland Harbor FS  
 JOB NO.: 79171.3383.345.FSZ  
 CLIENT: EPA

COMPUTED BY: JN  
 DATE: 7/28/2015  
 CHECKED BY: AIS  
 WRKSHT NO.: QTY-12

### Granular Activated Carbon Quantities (TON)

	Alt. B	Alt. C	Alt. D	Alt. E	Alt. F	Alt. G
Broadcast	147.4	110.8	71.3	0.6	0.6	0.3
All Residual	4,415.6	5,276.8	7,304.6	12,347.9	13,225.0	14,978.2
All Cap	1,267.3	1,494.2	2,000.4	3,024.9	5,037.9	6,240.9
<b>Total Tons</b>	<b>5,830.3</b>	<b>6,881.7</b>	<b>9,376.3</b>	<b>15,373.4</b>	<b>18,263.5</b>	<b>21,219.3</b>

	Alt. B	Alt. C	Alt. D	Alt. E	Alt. F	Alt. G
Open None	117.7	87.4	59.2	0.6	0.6	0.3
Open Residual	4,007.5	4,818.9	6,765.7	11,589.2	12,524.3	14,258.8
Open Cap	774.9	925.1	1,252.3	1,892.2	3,613.0	4,623.3
Confined None	29.7	23.4	12.1	-	-	-
Confined Residual	408.1	457.9	538.9	758.7	700.7	719.4
Confined Cap	492.4	569.1	748.0	1,132.7	1,425.0	1,617.6
<b>Total Tons</b>	<b>5,830.3</b>	<b>6,881.7</b>	<b>9,376.3</b>	<b>15,373.4</b>	<b>18,263.5</b>	<b>21,219.3</b>

### Thickness (in)

<b>Low Permeability Layer of Significantly Augmented Reactive Cap (Constructed)</b>	11	Add 11" Low Perm. Sand Layer to Significantly Aug. Caps				
	12	Remove 12" Reactive/Carbon Layer to Significantly Aug. Caps				
<b>Reactive/Carbon Layer of Significantly Augmented Reactive Cap (Modeled)</b>						
Area of Significantly Augmented Reactive Cap with BeachMix (AC)	1.00	1.10	1.14	1.38	1.42	1.42
Area of Significantly Augmented Reactive Cap without BeachMix (AC)	0.84	1.02	1.17	1.63	2.20	2.34
Volume of GAC/Sand Layers in Open Sig Aug Caps (CY)	1615	1778	1844	2230	2289	2289
Tons of Carbon to Remove from Open Sig Aug Caps (TON)	319	351	364	440	452	452
Volume of GAC/Sand Layers in Confined Sig Aug Caps (CY)	1348	1648	1881	2637	3556	3770
Tons of Carbon to Remove from Confined Sig Aug Caps (TON)	319	351	364	440	452	452

	Alt. B	Alt. C	Alt. D	Alt. E	Alt. F	Alt. G
Broadcast	147.4	110.8	71.3	0.6	0.6	0.3
All Residual	4,415.6	5,276.8	7,304.6	12,347.9	13,225.0	14,978.2
All Cap	629.4	791.9	1,271.8	2,144.2	4,133.8	5,336.7
<b>Total Tons</b>	<b>5,192.4</b>	<b>6,179.5</b>	<b>8,647.7</b>	<b>14,492.7</b>	<b>17,359.4</b>	<b>20,315.1</b>

	Alt. B	Alt. C	Alt. D	Alt. E	Alt. F	Alt. G
Open None	117.7	87.4	59.2	0.6	0.6	0.3
Open Residual	4,007.5	4,818.9	6,765.7	11,589.2	12,524.3	14,258.8
Open Cap	456.0	574.0	888.0	1,451.8	3,160.9	4,171.2
Confined None	29.7	23.4	12.1	-	-	-
Confined Residual	408.1	457.9	538.9	758.7	700.7	719.4
Confined Cap	173.5	217.9	383.7	692.4	972.9	1,165.5
<b>Total Tons</b>	<b>5,192.4</b>	<b>6,179.5</b>	<b>8,647.7</b>	<b>14,492.7</b>	<b>17,359.4</b>	<b>20,315.1</b>

### Granular Activated Carbon Quantities

<b>Total GAC Material Quantities (TON):</b>	<b>5,764</b>	<b>6,806</b>	<b>9,369</b>	<b>15,410</b>	<b>18,527</b>	<b>21,563</b>
<b>Confined GAC Placement (TON):</b>	<b>612</b>	<b>700</b>	<b>935</b>	<b>1,452</b>	<b>1,674</b>	<b>1,885</b>
<b>Open GAC Placement (TON):</b>	<b>4,582</b>	<b>5,481</b>	<b>7,713</b>	<b>13,042</b>	<b>15,686</b>	<b>18,431</b>
<b>Carbon for Capping Riverbanks (TON):</b>	<b>570</b>	<b>625</b>	<b>721</b>	<b>916</b>	<b>1,167</b>	<b>1,247</b>

## COST INDICES FOR ESCALATION

**Base Year for Work:**

**2015**

<b>Year</b>	<b>Cost Index<sup>1</sup></b>
2000	497.07
2001	503.52
2002	517.46
2003	529.95
2004	571.29
2005	608.36
2006	641.91
2007	673.52
2008	716.54
2009	703.00
2010	724.17
2011	756.48
2012	773.75
2013	787.64
2014	804.05
2015	814.29
2016	827.18
2017	842.07
2018	858.07
2019	875.23
2020	892.74
2021	910.59
2022	928.80
2023	947.38
2024	966.33
2025	985.65

<sup>1</sup> Yearly composite cost index (weighted average) from the U.S. Army Corps of Engineers Civil Works Construction Cost Index System (CWCCIS), EM 1110-2-1304, 31 March 2000. Revised as of 31 March 2015.



PROJECT: Portland Harbor FS  
JOB NO.: 79171.3383.345.FSZ  
CLIENT: EPA

COMPUTED BY: JN  
DATE: 7/22/2015

CHECKED BY: AB  
DATE CHECKED: 7/23/2015  
WRKSHT NO.: CALC-1

Description: Summary of cost buildup for unit costs for detailed costing of alternatives for Portland Harbor FS.

#### Unit Costs for Obstruction and Debris Removal

Pile Removal and Disposal, \$/EA:	\$635	cost developed by Anchor QEA, 2010 (See Backup Table 3), includes removal and disposal
Unescalated Pile Removal and Disposal, \$/EA:	\$635.00	
Pile Replacement, \$/EA:	\$6,636	cost developed by Anchor QEA, 2010 (See Backup Table 4)
Unescalated Pile Replacement, \$/EA:	\$6,636.00	
Temporary Dock Relocation, \$/EA:	\$89,173	cost developed by Anchor QEA, 2010 (See Backup Table 5)
Unescalated Temporary Dock Relocation, \$/EA:	\$89,173.00	
Debris Removal and Disposal, \$/EA:	\$11,630	cost developed by Anchor QEA, 2010 (See Backup Table 2), includes removal and disposal
Unescalated Debris Removal and Disposal, \$/EA:	\$11,630.00	

#### Unit Costs for Erosion/Residual Control Measures

Temporary Sheetpile Walls, \$/LF:	\$2,440	cost developed by Anchor QEA, 2010 (See Backup Table 6)
Unescalated Temporary Sheetpile Walls, \$/LF:	\$2,440.00	
Silt Curtain Installation, \$/LF:	\$86	cost developed by Anchor QEA, 2010 (See Backup Table 7)
Unescalated Silt Curtain Installation, \$/LF:	\$86.00	

#### Unit Costs for Offloading and Material Handling

Hydraulic Offloading, \$/CY:	\$5.60	cost developed by Anchor QEA, 2010 (See Backup Table 14)
Unescalated Hydraulic Offloading, \$/CY:	\$5.60	
Materials Handling from Barge to Upland Stockpile, \$/TON:	\$6.00	cost developed by Anchor QEA, 2010 (See Backup Table 24)
Unescalated Materials Handling from Barge to Upland Stockpile, \$/LCY:	\$9.30	
Mix DE with Dredged Material to Improve Handling, \$/TON:	\$2.00	cost developed by Anchor QEA, 2010 (See Backup Table 24)
Unescalated Mix DE with Dredged Material to Improve Handling, \$/TON:	\$2.00	
Materials Handling from Stockpile to Rail/Truck, \$/TON:	\$5.00	cost developed by Anchor QEA, 2010 (See Backup Table 24)
Unescalated Materials Handling from Barge to Upland Stockpile, \$/LCY:	\$7.75	

#### Unit Costs for Transload Facility Development

Transload Facility Permitting, \$/LS:	\$40,000.00	cost developed by Anchor QEA, 2010 (See Backup Table 24)
Unescalated Transload Facility Permitting, \$/LS:	\$40,000.00	
Transload Facility Development, \$/LS:	\$7,500,000.00	cost developed by Anchor QEA, 2010 (See Backup Table 24), includes full development cost
Unescalated Transload Facility Development, \$/LS:	\$7,500,000.00	
Yearly Property Lease, \$/AC:	\$23,500.00	cost developed by Anchor QEA, 2010 (See Backup Table 24)
Unescalated Yearly Property Lease, \$/AC:	\$23,500.00	
Labor Inspections During Operations of Transload Facility, \$/FTE:	\$75,000.00	cost developed by Anchor QEA, 2010 (See Backup Table 24)
Unescalated Labor Inspections During Operations of Transload Facility, \$/FTE:	\$75,000.00	
Unescalated Environmental Monitoring During Offloading at Transload Facility, \$/MO:	\$15,000.00	cost developed by Anchor QEA, 2010 (See Backup Table 24)
Unescalated Environmental Monitoring During Offloading at Transload Facility, \$/MO:	\$15,000.00	
Inspection and Monitoring Reporting for Transload Facility, \$/YR:	\$40,000.00	cost developed by Anchor QEA, 2010 (See Backup Table 24)
Unescalated Inspection and Monitoring Reporting for Transload Facility, \$/YR:	\$40,000.00	
Gondola/Rail Car Mobilization, \$/EA:	\$4,000.00	cost developed by Anchor QEA, 2010 (See Backup Table 24)
Unescalated Gondola/Rail Car Mobilization, \$/EA:	\$4,000.00	

#### Unit Costs for Transportation and Disposal

<b>Subtitle C Transportation and Disposal</b>		
Transportation to Subtitle C Landfill, \$/TON:	\$45.00	Vendor quote - CWM of the Northwest, 2015
Transportation to Subtitle C Landfill, \$/CY:	\$69.75	
Thermal Desorption Treatment at Subtitle C Landfill (High End of Treatment Cost Range), \$/TON:	\$565.00	Vendor quote - CWM of the Northwest, 2015
Thermal Desorption Treatment at Subtitle C Landfill (High End of Treatment Cost Range), \$/CY:	\$875.75	
Thermal Desorption Treatment at Subtitle C Landfill (Low End of Treatment Cost Range), \$/TON:	\$315.00	Vendor quote - CWM of the Northwest, 2015
Thermal Desorption Treatment at Subtitle C Landfill (Low End of Treatment Cost Range), \$/CY:	\$488.25	
Tipping Fee at Subtitle C Landfill, \$/TON:	\$85.00	Vendor quote - CWM of the Northwest, 2015
Tipping Fee at Subtitle C Landfill, \$/CY:	\$131.75	
<b>Subtitle D Transportation and Disposal</b>		
Transportation to Subtitle C Landfill, \$/TON:	\$58.50	Vendor quote - Republic Services, 2015
Unescalated Transportation to Subtitle C Landfill, \$/CY:	\$90.68	



PROJECT: Portland Harbor FS  
JOB NO.: 79171.3383.345.FSZ  
CLIENT: EPA

COMPUTED BY: JN  
DATE: 7/22/2015

CHECKED BY: AB  
DATE CHECKED: 7/23/2015  
WRKSHT NO.: CALC-1

Description: Summary of cost buildup for unit costs for detailed costing of alternatives for Portland Harbor FS.

#### Unit Costs for CDF Construction

CDF Construction, \$/LS: \$48,600,000.00 *cost developed by Anchor QEA for T4 CDF 60% Design (2011) - excludes Indirect construction costs,*  
CDF Construction, \$/LS: \$48,600,000.00 *Long-term monitoring and maintenance, and Contingency*

#### Unit Costs for Mitigation

Mitigation, \$/AC: \$2,086,338 *average cost of projects presented in Table 6.1-1, Appendix M by Anchor QEA, 2010. Includes \$1.9 million*  
Mitigation, \$/AC: \$2,086,338.00 *that was necessary for land acquisition*

#### Unit Costs for Monitoring

##### Monitored Natural Recovery for MNR/EMNR and Broadcast GAC Areas

Monitored Natural Recovery, \$/AC: \$3,271 *assumes 4 composite surface sediment samples per acre of MNR area. Developed by Anchor QEA, 2010*  
(See Backup Table 2)  
Unescalated Monitored Natural Recovery, \$/AC: \$3,270.92

##### Sitewide Monitoring

Site-wide Monitoring Costs, LS: \$849,742 *includes sampling for biota tissue chemistry and surface water chemistry, and mob/demob, data*  
Unescalated Site-wide Monitoring Costs, LS: \$849,742.00 *management and reporting for the two sampling events. Developed by Anchor QEA, 2010 (See Backup*  
Table 1)

##### Technology Monitoring

Shallow Subsurface Monitoring, \$/AC: \$70,063 *includes mob/demob, sampling for shallow subsurface sediment cores, hydrographic survey, data*  
management and reporting. Developed by Anchor QEA, 2010 (See Backup Table 4). Excludes  
contingency.  
Unescalated Cap Monitoring Costs, LS: \$70,063.30  
Reactive Layer Monitoring, \$/AC: \$78,943 *Porewater chemistry sampling. Developed by Anchor QEA, 2010 (See Backup Table 3). Excludes*  
contingency.  
Unescalated Reactive Layer Monitoring Costs, LS: \$78,943.00

#### Unit Costs for Reactive Layer Carbon Material and Placement

AquaGate+PAC 5%, \$/TON: \$400 *vendor quote Aquablok (2015)*  
Activated Carbon % by Weight in Product, %: 5%  
AquaGate+PAC 5%, \$/TON (as Carbon): \$8,000.00 *unit cost by ton as carbon*

##### Confined Placement Costs

Carbon Material Placement Cost, \$/TN: \$36.30 *same placement productivity and crew as sand per Anchor QEA, 2010 (See Backup Table 26)*  
Activated Carbon % by Weight in Product, %: 5%  
Carbon Material Placement Cost (as Carbon), \$/TN: \$726.00 *unit cost by ton as carbon*

##### Open Water Placement Costs

Carbon Material Placement Cost, \$/TN: \$17.60 *same placement productivity and crew as sand per Anchor QEA, 2010 (See Backup Table 26)*  
Activated Carbon % by Weight in Product, %: 5%  
Carbon Material Placement Cost (as Carbon), \$/TN: \$352.00 *unit cost by ton as carbon*

#### Mobilization/Demobilization (Mob/Demob) Percentage of Capital Costs Derivation

Lower Duwamish Waterway  
(LDW)  
Alternative 2R Alternative 6R  
Volume of Dredging, CY: 584,326 3,943,174  
Project Cost for Mob, LS: \$400,000 \$400,000  
Project Cost for Demob, LS: \$400,000 \$400,000  
Seasonal Mob/Demob (30% of Project Mob Cost or 15% of Project  
Mob/Demob Cost), \$/Season: \$120,000 \$120,000  
Duration of Construction, Seasons: 6.8 46.6  
Total Recurring/Seasonal Cost for Mob/Demob, LS: \$816,000 \$5,592,000  
Total Cost for Mobilization/Demobilization, LS: \$1,616,000 \$6,392,000  
Total Capital Cost of Alternative, LS: \$97,975,502 \$417,698,523  
Mobilization/Demobilization as Percentage of Capital Cost, %: 1.6% 1.5%  
Average Percentage of Capital Costs for  
Mobilization/Demobilization, %: 1.6%

## **Cost Estimate Backup**

## COST INDICES FOR ESCALATION

**Base Year for Work:**

**2015**

<b>Year</b>	<b>Cost Index<sup>1</sup></b>
2000	497.07
2001	503.52
2002	517.46
2003	529.95
2004	571.29
2005	608.36
2006	641.91
2007	673.52
2008	716.54
2009	703.00
2010	724.17
2011	756.48
2012	773.75
2013	787.64
2014	804.05
2015	814.29
2016	827.18
2017	842.07
2018	858.07
2019	875.23
2020	892.74
2021	910.59
2022	928.80
2023	947.38
2024	966.33
2025	985.65

<sup>1</sup> Yearly composite cost index (weighted average) from the U.S. Army Corps of Engineers Civil Works Construction Cost Index System (CWCCIS), EM 1110-2-1304, 31 March 2000. Revised as of 31 March 2015.



FLC Data Center Cost Sources

Base Year: 2015

COST CODES FOR LABOR AND UNIT COSTS

Cost Code	Description	Units	Unit Labor Cost	Unit Equipment Cost	Unit Material Cost	Unit Other Cost	Year of Cost Source	Escalation Factor	Area Factor	Adjusted Labor Cost	Adjusted Equipment Cost	Adjusted Material Cost	Adjusted Other Cost	PC OH	PC PF	Cost Source		Comments
																Source	Source ID	
L1	CAD Drafter	HR	\$31.31	\$0.00	\$0.00	\$0.00	2015	1	1	\$31.31	\$0.00	\$0.00	\$0.00	100%	9%	FLC	FLCDataCenter	
L2	Civil Engineer	HR	\$46.64	\$0.00	\$0.00	\$0.00	2015	1	1	\$46.64	\$0.00	\$0.00	\$0.00	100%	9%	FLC	FLCDataCenter	
L3	Clerks, Typist, Bookkeeper & Receptionist	HR	\$19.89	\$0.00	\$0.00	\$0.00	2015	1	1	\$19.89	\$0.00	\$0.00	\$0.00	100%	9%	FLC	FLCDataCenter	
L4	Environmental Engineer	HR	\$48.91	\$0.00	\$0.00	\$0.00	2015	1	1	\$48.91	\$0.00	\$0.00	\$0.00	100%	9%	FLC	FLCDataCenter	
L5	Environmental Lawyer	HR	\$71.72	\$0.00	\$0.00	\$0.00	2015	1	1	\$71.72	\$0.00	\$0.00	\$0.00	100%	9%	FLC	FLCDataCenter	
L6	Environmental Scientist	HR	\$37.70	\$0.00	\$0.00	\$0.00	2015	1	1	\$37.70	\$0.00	\$0.00	\$0.00	100%	9%	FLC	FLCDataCenter	
L7	Field Engineer	HR	\$31.42	\$0.00	\$0.00	\$0.00	2015	1	1	\$31.42	\$0.00	\$0.00	\$0.00	100%	9%	FLC	FLCDataCenter	
L8	Field Technician	HR	\$31.42	\$0.00	\$0.00	\$0.00	2015	1	1	\$31.42	\$0.00	\$0.00	\$0.00	100%	9%	FLC	FLCDataCenter	
L9	Geologist	HR	\$45.04	\$0.00	\$0.00	\$0.00	2015	1	1	\$45.04	\$0.00	\$0.00	\$0.00	100%	9%	FLC	FLCDataCenter	
L10	General Superintendent (P.M.)	HR	\$64.70	\$0.00	\$0.00	\$0.00	2015	1	1	\$64.70	\$0.00	\$0.00	\$0.00	100%	9%	FLC	FLCDataCenter	
L11	Project Manager	HR	\$82.17	\$0.00	\$0.00	\$0.00	2015	1	1	\$82.17	\$0.00	\$0.00	\$0.00	100%	9%	FLC	FLCDataCenter	
L12	Quality Control Engineer	HR	\$64.99	\$0.00	\$0.00	\$0.00	2015	1	1	\$64.99	\$0.00	\$0.00	\$0.00	100%	9%	FLC	FLCDataCenter	
L13	Paralegal	HR	\$29.56	\$0.00	\$0.00	\$0.00	2015	1	1	\$29.56	\$0.00	\$0.00	\$0.00	100%	9%	FLC	FLCDataCenter	
L14	Suveyor	HR	\$41.56	\$0.00	\$0.00	\$0.00	2015	1	1	\$41.56	\$0.00	\$0.00	\$0.00	100%	9%	FLC	FLCDataCenter	
L15	Suveyor Assistant	HR	\$29.37	\$0.00	\$0.00	\$0.00	2015	1	1	\$29.37	\$0.00	\$0.00	\$0.00	100%	9%	FLC	FLCDataCenter	
L16	Safety Engineer	HR	\$22.22	\$0.00	\$0.00	\$0.00	2015	1	1	\$22.22	\$0.00	\$0.00	\$0.00	100%	9%	FLC	FLCDataCenter	
L17	Boat Operator	HR	\$33.16	\$0.00	\$0.00	\$0.00	2015	1	1	\$33.16	\$0.00	\$0.00	\$0.00	100%	9%	FLC	FLCDataCenter	

Base Year: 2015

## COST CODES FOR MATERIAL AND UNIT COSTS

Cost Code	Description	Units	Unit Labor Cost	Unit Equipment Cost	Unit Material Cost	Unit Other Cost	Year of Cost Source	Escalation Factor	Area Factor	Adjusted Labor Cost	Adjusted Equipment Cost	Adjusted Material Cost	Adjusted Other Cost	PC OH	PC PF	Cost Source		Comments
																Source	Source ID	
M1	Sand	LCY	\$0.00	\$0.00	\$17.52	\$0.00	2010	1.125	1	\$0.00	\$0.00	\$19.71	\$0.00	0%	0%	P	Previous Work	Knife River Quote #7838 (2010)
M2	ODOT 200 Armor	LCY	\$0.00	\$0.00	\$51.19	\$0.00	2010	1.125	1	\$0.00	\$0.00	\$57.59	\$0.00	0%	0%	P	Previous Work	Knife River Quote #7838 (2010)
M4	Carbon (AquaGate + PAC 5%)	TON	\$0.00	\$0.00	\$8,000.00	\$0.00	2015	1	1	\$0.00	\$0.00	\$8,000.00	\$0.00	5%	0%	V	Vendor Quote	Vendor Quote - AquaBlok 2015. Material cost is \$/TON (as Carbon).
M5	ODOT 100 Beach Mix	LCY	\$0.00	\$0.00	\$51.19	\$0.00	2010	1.125	1	\$0.00	\$0.00	\$57.59	\$0.00	0%	0%	P	Previous Work	Knife River Quote #7838 (2010)
M7	Diatomaceous Earth	TON	\$0.00	\$0.00	\$94.00	\$0.00	2010	1.125	1	\$0.00	\$0.00	\$105.75	\$0.00	0%	0%	P	Previous Work	Vendor Quote - Waste Management, 2010.
M8	Transportation to Subtitle C/TSCA Landfill	CY	\$0.00	\$0.00	\$69.75	\$0.00	2015	1	1	\$0.00	\$0.00	\$69.75	\$0.00	8%	9%	V	Vendor Quote	Assumes truck transportation. Quote - CWM of the Northwest.
M9	Thermal Desorption Treatment at Subtitle C/TSCA Landfill (High End of Treatment Cost Range)	CY	\$0.00	\$0.00	\$875.75	\$0.00	2015	1	1	\$0.00	\$0.00	\$875.75	\$0.00	1%	0%	V	Vendor Quote	Quote - CWM of the Northwest.
M10	Tipping Fee at Subtitle C/TSCA Landfill	CY	\$0.00	\$0.00	\$131.75	\$0.00	2015	1	1	\$0.00	\$0.00	\$131.75	\$0.00	1%	0%	V	Vendor Quote	Quote - CWM of the Northwest.
M11	Transportation and Disposal at Subtitle D Landfill	CY	\$0.00	\$0.00	\$90.68	\$0.00	2015	1	1	\$0.00	\$0.00	\$90.68	\$0.00	1%	0%	P	Previous Work	Quote - Republic Services (Roosevelt Landfill).
M13	Geotextile	AC	\$0.00	\$0.00	\$5,614.40	\$0.00	2014	1.013	1	\$0.00	\$0.00	\$5,687.39	\$0.00	5%	0%	V	Vendor Quote	Assumes rail transportation to disposal facility.
M14	Copy and Shipping Allowance	LS	\$0.00	\$0.00	\$0.00	\$1,500.00	2015	1	1	\$0.00	\$0.00	\$0.00	\$1,500.00	0%	0%	A	Allowance	Vendor Quote (2014)
M15	Mobilization/Demobilization	LS	\$0.00	\$0.00	\$0.00	1.6% of Total Cost	2015	1	1	\$0.00	\$0.00	\$0.00	15%	0%	0%	A	Previous Work	Assumes 1.6% of total capital costs per Lower Duwamish. See Calculations for derivation.
M16	Mobilization/Demobilization for Long Term Maintenance	LS	\$0.00	\$0.00	\$0.00	1.6% of Total Cost	2015	1	1	\$0.00	\$0.00	\$0.00	15%	0%	0%	A	Previous Work	Assumes 1.6% of total capital costs per Lower Duwamish. See Calculations for derivation.
M17																		
M18	Sand Backfill	LCY	\$0.00	\$0.00	\$17.52	\$0.00	2010	1.125	1	\$0.00	\$0.00	\$19.71	\$0.00	0%	0%	P	Previous Work	Knife River Quote #7838 (2010)
M19																		
M20	Thermal Desorption Treatment at Subtitle C/TSCA Landfill (Low End of Treatment Cost Range)	CY	\$0.00	\$0.00	\$489.00	\$0.00	2015	1	1	\$0.00	\$0.00	\$489.00	\$0.00	1%	0%	V	Vendor Quote	Quote - CWM of the Northwest
M21	Buoy	EA	\$0.00	\$0.00	\$421.76	\$0.00	2015	1	1	\$0.00	\$0.00	\$421.76	\$0.00	5%	0%	V	Vendor Quote	Quote - Go2Marine
A1	18' Boat	HR	\$0.00	\$0.00	\$0.00	\$28.08	2015	1	1	\$0.00	\$0.00	\$0.00	\$28.08	8%	9%	Mill	Mill Assembly	

Cost Code	Work or Material Description	Description for Cost Worksheets	Units	Previous Work Unit Cost	Year of Cost Source	Escalation Factor	Area Factor	Adjusted MII Unit Cost	PC OH	PC PF	Cost Source		Comments
											Source	Source ID	
P2	Sand Placement (Confined)	Sand Placement (Confined)	LCY	\$43.56	2010	1.125	1	\$49.01	0%	0%	P	Previous Work	Developed by Anchor QEA (2010)
P3	ODOT 200 Placement (Confined)	ODOT 200 Placement (Confined)	LCY	\$52.00	2010	1.125	1	\$58.50	0%	0%	P	Previous Work	Developed by Anchor QEA (2010)
P4													
P5	Beach Mix Placement (Confined)	Beach Mix Placement (Confined)	LCY	\$52.00	2010	1.125	1	\$58.50	0%	0%	P	Previous Work	Developed by Anchor QEA (2010)
P6	Sand Placement (Open Water)	Sand Placement (Open Water)	LCY	\$21.12	2010	1.125	1	\$23.76	0%	0%	P	Previous Work	Developed by Anchor QEA (2010)
P7	ODOT 200 Placement (Open Water)	ODOT 200 Placement (Open Water)	LCY	\$25.19	2010	1.125	1	\$28.34	0%	0%	P	Previous Work	Developed by Anchor QEA (2010)
P8													
P9	Debris Removal and Disposal	Debris Removal and Disposal	AC	\$11,630.00	2010	1.125	1	\$13,083.75	0%	0%	P	Previous Work	Developed by Anchor QEA (2010)
P10	Pile Removal and Disposal	Pile Removal and Disposal	EA	\$635.00	2010	1.125	1	\$714.38	0%	0%	P	Previous Work	Developed by Anchor QEA (2010)
P11	Pile Replacement	Pile Replacement	EA	\$6,636.00	2010	1.125	1	\$7,465.50	0%	0%	P	Previous Work	Developed by Anchor QEA (2010)
P12	Temporary Dock Relocation	Temporary Dock Relocation	EA	\$89,173.00	2010	1.125	1	\$100,319.63	0%	0%	P	Previous Work	Developed by Anchor QEA (2010)
P13	Purchase, Install, and Maintain Silt Curtains	Purchase, Install and Maintain Silt Curtains	LF	\$86.00	2010	1.125	1	\$96.75	0%	0%	P	Previous Work	Developed by Anchor QEA (2010)
P14	Purchase, Install, and Remove Sheet Pile Walls	Purchase, Install and Remove Sheet Pile Walls	LF	\$2,440.00	2010	1.125	1	\$2,745.00	0%	0%	P	Previous Work	Developed by Anchor QEA (2010)
P15	Open Water Dredging and Transport	Open Water Dredging and Transport	CY	\$33.80	2010	1.125	1	\$38.03	0%	0%	P	Previous Work	Developed by Anchor QEA (2010)
P16	Confined Dredging and Transport	Confined Dredging and Transport	CY	\$47.70	2010	1.125	1	\$53.66	0%	0%	P	Previous Work	Developed by Anchor QEA (2010)
P17	Dredging from Shore	Dredging from Shore	CY	\$41.60	2010	1.125	1	\$46.80	0%	0%	P	Previous Work	Developed by Anchor QEA (2010)
P18													
P19	Hydraulic Offloading	Hydraulic Offloading	CY	\$5.60	2010	1.125	1	\$6.30	0%	0%	P	Previous Work	Developed by Anchor QEA (2010)
P20	Materials Handling from Barge to Upland Stockpile	Materials Handling from Barge to Upland Stockpile	CY	\$9.30	2010	1.125	1	\$10.46	0%	0%	P	Previous Work	Developed by Anchor QEA (2010)
P21	Mix DE with Dredged Material to Improve Handling	Mix DE with Dredged Material to Improve Handling	TON	\$2.00	2010	1.125	1	\$2.25	0%	0%	P	Previous Work	Developed by Anchor QEA (2010)
P22	Materials Handling from Stockpile to Truck/Rail Car	Materials Handling from Stockpile to Truck/Rail Car	CY	\$7.75	2010	1.125	1	\$8.72	0%	0%	P	Previous Work	Developed by Anchor QEA (2010)
P23	Organoclay Mat Material and Placement (Confined)	Organoclay Mat Material and Placement (Confined)	SF	\$21.10	2010	1.125	1	\$23.74	0%	0%	P	Previous Work	Developed by Anchor QEA (2010)
P24	Organoclay Mat Material and Placement (Open)	Organoclay Mat Material and Placement (Open)	SF	\$6.30	2010	1.125	1	\$7.09	0%	0%	P	Previous Work	Developed by Anchor QEA (2010)
P25	Monitored Natural Recovery	Monitored Natural Recovery	AC	\$3,270.92	2010	1.125	1	\$3,679.79	0%	0%	P	Previous Work	Developed by Anchor QEA (2010)
P26	Sitewide Monitoring	Sitewide Monitoring	LS	\$849,742.00	2010	1.125	1	\$955,959.75	0%	0%	P	Previous Work	Developed by Anchor QEA (2010)
P27	Cap Monitoring	Cap Monitoring	AC	\$70,063.30	2010	1.125	1	\$78,821.21	0%	0%	P	Previous Work	Developed by Anchor QEA (2010)
P28	Reactive Layer Monitoring	Reactive Layer Monitoring	AC	\$78,943.00	2010	1.125	1	\$88,810.88	0%	0%	P	Previous Work	Developed by Anchor QEA (2010)
P29	Backfill Placement (Confined)	Backfill Placement (Confined)	LCY	\$43.56	2010	1.125	1	\$49.01	0%	0%	P	Previous Work	Developed by Anchor QEA (2010)
P30	Backfill Placement (Open Water)	Backfill Placement (Open Water)	LCY	\$21.12	2010	1.125	1	\$23.76	0%	0%	P	Previous Work	Developed by Anchor QEA (2010)
P31	Transload Facility Permitting	Transload Facility Permitting	LS	\$40,000.00	2010	1.125	1	\$45,000.00	0%	0%	P	Previous Work	Developed by Anchor QEA (2010)
P32	Transload Facility Development	Transload Facility Development	LS	\$7,500,000.00	2010	1.125	1	\$8,437,500.00	0%	0%	P	Previous Work	Developed by Anchor QEA (2010)
P33	Yearly Property Lease	Yearly Property Lease	AC	\$23,500.00	2010	1.125	1	\$26,437.50	0%	0%	P	Previous Work	Developed by Anchor QEA (2010)
P34	Labor Inspections During Operations of Transload Facility	Labor Inspections During Operations of Transload Facility	FTE	\$75,000.00	2010	1.125	1	\$84,375.00	0%	0%	P	Previous Work	Developed by Anchor QEA (2010)
P35	Environmental Monitoring During Offloading at Transload Facility	Environmental Monitoring During Offloading at Transload Facility	MO	\$15,000.00	2010	1.125	1	\$16,875.00	0%	0%	P	Previous Work	Developed by Anchor QEA (2010)
P36	Inspection and Monitoring Reporting for Transload Facility	Inspection and Monitoring Reporting for Transload Facility	YR	\$40,000.00	2010	1.125	1	\$45,000.00	0%	0%	P	Previous Work	Developed by Anchor QEA (2010)
P37	Gondola/Rail Car Mobilization	Gondola/Rail Car Mobilization	EA	\$4,000.00	2010	1.125	1	\$4,500.00	0%	0%	P	Previous Work	Developed by Anchor QEA (2010)
P39	Beach Mix Placement (Open Water)	Beach Mix Placement (Open Water)	LCY	\$25.19	2010	1.125	1	\$28.34	0%	0%	P	Previous Work	Developed by Anchor QEA (2010)
P40	Carbon (AquaGate + PAC 5%) Placement (Confined)	Carbon (AquaGate + PAC 5%) Placement (Confined)	TON	\$726.00	2010	1.125	1	\$816.75	0%	0%	P	Previous Work	Adapted from unit cost developed by Anchor QEA (2010). Unit cost is \$7TON as carbon.
P41	Carbon (AquaGate + PAC 5%) Placement (Open Water)	Carbon (AquaGate + PAC 5%) Placement (Open Water)	TON	\$352.00	2010	1.125	1	\$396.00	0%	0%	P	Previous Work	Adapted from unit cost developed by Anchor QEA (2010). Unit cost is \$7TON as carbon.
P49	CDF Construction	CDF Construction	LS	\$48,600,000.00	2011	1.077	1	\$52,342,200.00	0%	0%	P	Previous Work	Developed by Anchor QEA (2011)
P50	Mitigation	Mitigation	AC	\$2,086,338.00	2010	1.125	1	\$2,347,130.25	0%	0%	P	Previous Work	Average cost of two Lower Duwamish projects presented and referenced in Table 6.1-1 by Anchor QEA (2010).
P51	Geotextile Installation	Geotextile Installation	AC	\$6,969.60	2014	1.013	1	\$7,060.20	8%	9%	P	Previous Work	Vendor Quote - Geo-Synthetics (2014). Includes labor and equipment for installation



# Call Report

9200 Ward Parkway, Suite 500  
Kansas City, MO – 64114  
Tel: (816) 444-8270  
Fax: (816) 523-2600

**Project:** Portland Harbor FS

**Client:** EPA Region 10

**Job No:** 79171

**Date:** 7/17/2015

☐ Phone in   ☒ Phone out   ☒ Current project   ☐ Prospective project/Marketing   ☐ Administrative  
☐ Other

**Made by/Received by:** Abby Broadstone

**Talked with:** Mark Krening at Chemical Waste Management of the Northwest (503-519-3959)

**Subject:** Subtitle C Transportation, Pretreatment and Disposal of Contaminated Sand/Sediment

**Distribution:** Scott Coffey, Gary Hazen, and Eleonora Borisova

## Discussion:

**Standard Tipping Fee:** Standard tipping fee for Subtitle C is \$85/TN. This is for waste that does not require pretreatment or does not exceed LDRs.

**Treatment Costs:** Stabilization is typically used for heavy metal contamination, and solidification is typically used for non-hazardous waste. Based on the fact that the waste contains TCE, PAH, Benzene (D018), and listed wastes (F002 and F027), we will need thermal desorption with organic recovery unit. The costs for thermal desorption treatment is in the range of \$315/TN and \$565/TN based on concentration and moisture content. This cost is based on the minimum volumes, those estimated for Alt B. There may be some cost savings based on volumes of waste.

Note: At the Arlington Facility they cannot accept Dioxin/Furan contamination with concentrations above treatment standards of 1 (typical of F027 wastes). This waste would have to go to Canada for incineration. This was not communicated with vendor, but note that the RPAC Outfall (F027) Waste concentrations of TCDDs do not exceed the 1 ug/kg treatment standard, total TCDFs were detected offshore of the RPAC outfall in two samples at 3.878 and 3.614 ug/kg.

**Transportation Costs:** Truck transport costs from Portland are approximately \$45/TN with up to 34 TN/truckload. Rail transportation from Portland does not provide costs savings compared to truck transport. Barge costs may provide some cost savings based on bulk volume efficiencies; however, there is not a Port in Arlington. The barge will need to unload at the Port of Morral and trucked to Chemical Waste Management in Arlington. Barge costs are site-specific and dependent on location.

**Action Required (what, who, when):**

**Nielsen, Justin C.**

---

**To:** Whiteman, Leslie  
**Subject:** RE: Pricing for Disposal of Sediments at Roosevelt Landfill

**From:** Whiteman, Leslie [mailto:LWhiteman@republicservices.com]  
**Sent:** Tuesday, July 28, 2015 12:37 PM  
**To:** Nielsen, Justin C. <nielsenjc@cdmsmith.com>  
**Cc:** Whiteman, Leslie <LWhiteman@republicservices.com>  
**Subject:** RE: Pricing for Disposal of Sediments at Roosevelt Landfill

Ok, if we assume you would be responsible for the transload of the dredge sediment and we would be responsible for transport and disposal from the Portland Area and we would use rail there- \$55.00 per ton plus the Portland Metro Taxes (which is \$ 3.50 per ton.

If we offload barges at SDS in Bingen- where we would be responsible for transload, transport and disposal-\$70.00 per ton plus the Portland Metro Taxes.

When you have more information I can work on the numbers but the above is a good estimate.

Leslie



We'll handle it from here.™

**Leslie Whiteman** Special Waste Sales

54 South Dawson Street  
Seattle, WA 98134  
e [lwhiteman@republicservices.com](mailto:lwhiteman@republicservices.com)  
o 206.332.7711 c 206.391.1389  
w [republicservices.com](http://republicservices.com)

**Nielsen, Justin C.**

---

**From:** John Collins <jcollins@aquablok.com>  
**Sent:** Tuesday, July 21, 2015 11:13 AM  
**To:** Broadstone, Abby  
**Cc:** Nielsen, Justin C.  
**Subject:** RE: CDM Smith Aquagate Sand Mixture Quote

Abby,

Thanks for the call, glad to get into the discussion.

Per our call, we can offer two products that meet the 0.12lb/SF/cm objective. These are as follows:

**AquaGate+PAC 5%** - \$385/CY (1,944lb of material at \$400/ton) – This product would constitute 94.7% of a CY in volume, so only a small amount sand/aggregate would be required to fill out the CY volume.

**AquaGate+PAC 10%** - \$220/CY (972lb of material at \$450/ton) – This product would constitute 48.6% of a CY in volume, so the balance of the volume would need a sand/aggregate mixture.

In regard to the 0.48lb/CF/cm carbon loading (which equates to 1.22lb/SF/Inch), AquaBlok does not have a carbon amended product that can meet this loading. However, for comparison, our AquaGate+PAC 10% material will provide a loading of 0.616lb/SF/Inch in carbon loading – which is approximately one half of this requested target loading. The pricing for this material at maximum loading is based on our nominal bulk density of 74lb/CF – or approximately 2,000lb per CY - \$450/CY (which is also almost exactly the price per ton).

As we discussed, I would question the 0.48lb/SF/cm loading, as this is very high compared to most activated carbon applications we have seen in the industry. It would be appreciated if we would have a further opportunity to discuss the need for this high loading level.

Please give me a call if you want to discuss or review the above.

Thanks, John

John A. Collins | COO  
AquaBlok, Ltd. | [www.aquablok.com](http://www.aquablok.com)  
3401 Glendal Ave. Suite 300 | Toledo, OH 43614  
Tel: 419.385.2980 | Cell 419.343.7803



---

**From:** Broadstone, Abby [mailto:BroadstoneAR@cdmsmith.com]  
**Sent:** Tuesday, July 21, 2015 10:13 AM  
**To:** John Collins  
**Cc:** Nielsen, Justin C.  
**Subject:** CDM Smith Aquagate Sand Mixture Quote

Hi John,

Thanks for your help. We need cost for Aquagate (\$/CY) for activated carbon rates as follows:

0.12 lb/ft<sup>2</sup>/cm

0.48 lb/ft<sup>2</sup>/cm

Thanks,

~abby

**Abby R. Broadstone, P.E., LEED AP**

Environmental Engineer

CDM Smith

Phone: 314.704.5309

Fax: 816.412.3167

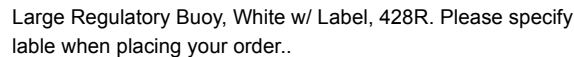
Email: [broadstonear@cdmsmith.com](mailto:broadstonear@cdmsmith.com)



Please consider the environment before printing this email.

### Recently Viewed Products

**Mfr. Jim Buoy**



- Shell: High density polyethylene
- Internal foam: 2-3 LB density polyurethane foamed to waterline
- Internal Ballast: Reinforced concrete
- Labels: 200 stock labels included in buoy price - no extra charge
- All eye bolts are permanently bonded inside the buoy during molding cycle, thus preventing wear and eventual loss of flotation
- **Please call for availability if ship-time is greater than 1 day**

- AREA CLOSED
- NO BOATS
- KEEP OUT
- MARINA ENTRANCE
- NO WATERCRAFT
- SLOW 5 MPH
- NO WAKE
- NO SWIMMING
- DANGER
- SWIM AREA
- DANGER KEEP OUT
- NO ANCHORING
- SHALLOW AREA
- SLOW 10 MPH
- RACE COURSE
- SLOW NO WAKE
- DANGER ROCKS
- IDLE SPEED
- HAZARD
- Many more - just let us know that you need!

Overall Height:	62-1/2"
Can Diameter:	15"
Base Diameter:	19"
above waterline:	41"
Weight:	65 lbs.
Eye-bolt Size:	5/8"

**Price: \$421.76**

**When will my order arrive?** Add the Estimated Leaves Warehouse Time + Estimated Shipping Time.

### Customers Who Viewed This Product Also Viewed



**\$243.27**

### Marker Buoy, Regulatory,



# Telephone Call Report

9200 Ward Parkway, Suite 500  
Kansas City, MO – 64114  
Tel: (816) 444-8270  
Fax: (816) 523-2600

**Project:** Gilt Edge Mine Site, OU1

**Client:** USEPA

**Job No.**

**Date:** Sep 10, 2014 3:50 pm

☐ Phone in ☐ Phone out ☐ Current Project ☐ Prospective Project/Marketing ☐ Administrative ☒ Other

**Made by/Received by:** Abhay Sonawane

**Talked with:** Mark Downs, Geo-Synthetics, Inc.

**Subject:** Price Quote for Geomembrane, Geocomposite, and Geotextile Installation

**Distribution:**

● **Discussion:**

**Company:**

Geo-Synthetics, Inc.  
Mark H. Downs  
Geo-Synthetics, Inc.  
Ph: (605)428-4353  
Fax: (605)428-4393  
Cell: (262)366-5570  
markd@geo-synthetics.com

Installation costs only, no material

**Geomembrane Installation (60 mil):** \$0.29 / SF

**Geotextile Installation (8 oz):** \$0.16 / SF

**Geocomposite Installation (8-300-8):** \$0.288 / SF

● **Action Required (what, who, when):**

# Telephone Call Report

9200 Ward Parkway, Suite 500  
Kansas City, MO - 64114  
Tel: (816) 444-8270  
Fax: (816) 523-2600

**Project:** Gilt Edge Mine Site, OU1

**Client:** USEPA

**Job No.**

**Date:** Sep 2014

☐ Phone in ☒ Phone out ☐ Current Project ☐ Prospective Project/Marketing ☐ Administrative ☐ Other

**Made by/Received by:** Abhay Sonawane

**Talked with:** Greg/Scott, Bierschbach Equipment & Supply

**Subject:** Price Quote for Nonwoven Geotextile (Mirafi® 180N)

**Distribution:**

● **Discussion:**

**Company:**

Bierschbach Equipment & Supply  
3030 N Plaza Dr  
Rapid City, SD 57702

Tel: (605) 348-6440, (800) 658-5437

**Geotextile:**

*(Nonwoven, Needle punched, Polypropylene, 8 oz/yd<sup>2</sup>, 15' x 300' (500 yd<sup>2</sup>))*

- Price per Roll (material only) - **\$0.12/SF, \$1.08/SY**
- Delivery Cost - **\$550/load (approx. 15 rolls per load)**

● **Action Required (what, who, when):**



PROJECT: Portland Harbor FS  
 JOB NO.: 79171.3383.345  
 CLIENT: EPA Region 10

COMPUTED BY: JN  
 DATE: 07/09/15

CHECKED BY: AB  
 DATE CHECKED: 07/16/15  
 PAGE NO.: LB-01

**Description:** Determination of base wage rates for management and engineering personnel (i.e., project manager, civil engineer, etc.). Wage rates based on FLCdatacenter.com salary estimates for Multnomah County, OR obtained July 2015. Salary rates were used for hourly labor rate determination for the MII estimate. Payroll taxes and insurance are included in the MII estimate calculations.

#### Escalation

Previous salary cost index (4Q15): **818.54** EM 1110-2-1304, Rev. 31 March 2015

Cost estimate prep cost index (4Q15): **818.54** EM 1110-2-1304, Rev. 31 March 2015

#### Hourly Wage Calculations

Number of work hours per year: **2080** 52 weeks x 40 hours per week

<u>Labor Category</u>	<u>Salary</u>	<u>Hourly</u>	<u>Benefits</u>	<u>Bonus</u>	<u>Year</u>	<u>Source</u>
General Superintendent	\$110,573	\$53.16	15.20%	6.50%	2015	FLCdatacenter.com
Project Manager	\$140,442	\$67.52	15.20%	6.50%	2015	FLCdatacenter.com
Admin (Clerks, Typists)	\$33,987	\$16.34	15.20%	6.50%	2015	FLCdatacenter.com
Geologist	\$76,981	\$37.01	15.20%	6.50%	2015	FLCdatacenter.com
Civil Engineer	\$79,706	\$38.32	15.20%	6.50%	2015	FLCdatacenter.com
Environmental Engineer	\$83,595	\$40.19	15.20%	6.50%	2015	FLCdatacenter.com
Safety Engineer	\$91,936	\$44.20	15.20%	6.50%	2015	FLCdatacenter.com
Quality Control Engineer	\$111,072	\$53.40	15.20%	6.50%	2015	FLCdatacenter.com
Field Engineer	\$53,706	\$25.82	15.20%	6.50%	2015	FLCdatacenter.com
Operator / Technician	\$53,706	\$25.82	15.20%	6.50%	2015	FLCdatacenter.com
Draftsman	\$53,518	\$25.73	15.20%	6.50%	2015	FLCdatacenter.com
Surveyor, Chief	\$71,032	\$34.15	15.20%	6.50%	2015	FLCdatacenter.com
Surveyor	\$50,190	\$24.13	15.20%	6.50%	2015	FLCdatacenter.com
Environmental Scientist	\$64,438	\$30.98	15.20%	6.50%	2015	FLCdatacenter.com
Environmental Lawyer	\$122,574	\$58.93	15.20%	6.50%	2015	FLCdatacenter.com
Paralegal	\$50,523	\$24.29	15.20%	6.50%	2015	FLCdatacenter.com
Procurement Specialist	\$37,981	\$18.26	15.20%	6.50%	2015	FLCdatacenter.com
Boat Operator	\$56,680	\$27.25	15.20%	6.50%	2015	FLCdatacenter.com

<u>Labor Category</u>	<u>Salary</u>	<u>Hourly</u>	<u>Taxable</u>	<u>Non-Tax</u>	<u>Total</u>
			<u>Fringe</u>	<u>Fringe<sup>1</sup></u>	
General Superintendent	\$110,573	\$53.16	\$11.54	\$0.00	\$64.70
Project Manager	\$140,442	\$67.52	\$14.65	\$0.00	\$82.17
Admin (Clerks, Typists)	\$33,987	\$16.34	\$3.55	\$0.00	\$19.89
Geologist	\$76,981	\$37.01	\$8.03	\$0.00	\$45.04
Civil Engineer	\$79,706	\$38.32	\$8.32	\$0.00	\$46.64
Environmental Engineer	\$83,595	\$40.19	\$8.72	\$0.00	\$48.91
Safety Engineer	\$91,936	\$44.20	\$9.59	\$0.00	\$53.79
Quality Control Engineer	\$111,072	\$53.40	\$11.59	\$0.00	\$64.99
Field Engineer	\$53,706	\$25.82	\$5.60	\$0.00	\$31.42
Operator / Technician	\$53,706	\$25.82	\$5.60	\$0.00	\$31.42
Draftsman	\$53,518	\$25.73	\$5.58	\$0.00	\$31.31
Surveyor, Chief	\$71,032	\$34.15	\$7.41	\$0.00	\$41.56
Surveyor	\$50,190	\$24.13	\$5.24	\$0.00	\$29.37
Environmental Scientist	\$64,438	\$30.98	\$6.72	\$0.00	\$37.70
Environmental Lawyer	\$122,574	\$58.93	\$12.79	\$0.00	\$71.72
Paralegal	\$50,523	\$24.29	\$5.27	\$0.00	\$29.56
Procurement Specialist	\$37,981	\$18.26	\$3.96	\$0.00	\$22.22
Boat Operator	\$56,680	\$27.25	\$4.91	\$1.00	\$33.16

#### Notes:

<sup>1</sup> - Non-taxable fringe is set at \$0.00 in MII and is taken out of Taxable Fringe per the U.S. Army Corps of Engineers

Table 2. Debris Removal and Disposal

ESTIMATE WORKSHEET 3.1													
DEBRIS REMOVAL & DISPOSAL													
BID DATE		PROJECT LOCATION					DESCRIPTION OF ITEM					ITEM NO.	
												3.1	
						PRODUCTION DATA							
TOTAL QUANTITY ON PROPOSAL	2 Acre					HOURS PER SHIFT	SHIFTS PER DAY	DAYS PER WEEK	DAILY UNIT PRODUCTION RATE		DAYS REQ. TO COMPLETE		
QUANTITY						10	1	6	2		1		
ESTIMATE WORKSHEET		TOTAL LABOR		TOTAL MATERIAL		TOTAL EQUIPMENT	TOTAL RENTED EQUIPMENT		TOTAL SUB-CONTRACTOR		TOTAL		
WORKSHEET 3.1		\$4,516.20		\$3,614.00		\$0.00	\$5,076.00		\$750.00		\$13,956.20		
											\$0.00		
GRAND TOTALS		\$4,516.20		\$3,614.00		\$0.00	\$5,076.00		\$750.00		\$13,956.20		
UNIT PRICES		\$3,010.80		\$2,409.34		\$0.00	\$3,384.00		\$500.00				
SUB-CONTRACTOR	WORK TO PERFORM	QUANTITY UNITS	UNIT COST		TOTAL COST				UNIT PRICE		\$9,304.14		
									UNIT OF MEASURE		Acre		
Disposal Assumption		15	\$50.00		\$750.00				OH&P 25%	\$11,630			
					\$0.00								
					\$0.00								
					\$0.00								
					\$0.00								
					\$0.00								
BARE UNIT COST		\$500.00	TOTAL COST			\$750.00							
LABOR CLASSIFICATION	WORK TO PERFORM	TOTAL MEN	TOTAL HOURS	HRLY RATE	TOTAL COST	OWN EQUIPMENT	WORK TO PERFORM	FUEL GALS.	TOTAL UNITS	TOTAL HOURS	HRLY RATE	TOTAL COST	
Crane Operator		1	10	\$51.00	\$510.00								
Oiler		1	10	\$50.00	\$500.00								
Captain	Tug	1	10	\$54.00	\$540.00								
Laborer		3	10	\$37.00	\$1,110.00								
Work Boat Labor		1	10	\$37.00	\$370.00								
Teamster		1	10	\$37.00	\$370.00								
Operator	Offload	1	10	\$46.00	\$460.00								
17% OT			0		\$656.20								
BARE UNIT COST		\$3,010.80	TOTAL LABOR COST			\$4,516.20		BARE UNIT COS \$0.00		0	TOTAL SES COST \$0.00		
MATERIAL / SERVICES		QUANTITY UNITS	UNIT COST		TOTAL COST	RENTAL EQUIP	WORK TO PERFORM	FUEL GALS.	TOTAL UNITS	TOTAL HOURS	HRLY RATE	TOTAL COST	
Fuel / Oil / Grease		405	\$4.00		\$1,620.00	150 Ton Crane	Removal	120	1	10	\$111.00	\$1,110.00	
PPE		9	\$15.00		\$135.00	Tug	Move	150	1	10	\$60.00	\$600.00	
Equipment Repair 7%		1	\$216.30		\$216.30	Work Boat		15	1	10	\$56.00	\$560.00	
Oil Boom (FT)		250	\$2.00		\$500.00	Scows	Debris	0	1	10	\$68.00	\$680.00	
Debris Curtain (FT)		250	\$3.50		\$875.00	Barge		0	1	10	\$54.00	\$540.00	
					\$0.00	PC 300 long front	Unload	60	1	10	\$50.00	\$500.00	
					\$0.00	Dump Truck	Move	60	1	10	\$32.00	\$320.00	
					\$0.00	Clam Buck (10 cy)		0	1	10	\$39.00	\$390.00	
					\$0.00			0		0	\$0.00	\$0.00	
					\$0.00			0		0	\$0.00	\$0.00	
					\$0.00			0		0	\$0.00	\$0.00	
					\$0.00			0		0	\$0.00	\$0.00	
					\$0.00			0		0	\$0.00	\$0.00	
					\$0.00			0		0	\$0.00	\$0.00	
					\$0.00			0		0	\$0.00	\$0.00	
TAX AT 8%					\$267.70	TAX 8%		0		0	\$0.00	\$376.00	
BARE UNIT COST		\$0.00	TOTAL MATERIAL COST			\$3,614.00		BARE UNIT COS \$0.00		405	TOTAL RENTED EQUIP \$5,076.00		

Table 3. Pile Removal

ESTIMATE WORKSHEET 3.2												
PILE REMOVAL												
BID DATE		PROJECT LOCATION					DESCRIPTION OF ITEM				ITEM NO.	
											3.2	
							HOURS PER SHIFT	SHIFTS PER DAY	DAYS PER WEEK	DAILY UNIT PRODUCTION RATE	DAYS REQ. TO COMPLETE	
TOTAL QUANTITY ON PROPOSAL	25 EA											
QUANTITY							10	1	6	25	1	
ESTIMATE WORKSHEET		TOTAL LABOR		TOTAL MATERIAL		TOTAL EQUIPMENT	TOTAL RENTED EQUIPMENT		TOTAL SUB-CONTRACTOR		TOTAL	
		\$3,510.00		\$3,651.80			\$4,287.60		\$1,250.00		\$12,699.40	
GRAND TOTALS		\$3,510.00		\$3,651.80		\$0.00	\$4,287.60		\$1,250.00		\$12,699.40	
UNIT PRICES		\$140.40		\$146.07		\$0.00	\$171.50		\$50.00			
SUB-CONTRACTOR	WORK TO PERFORM	QUANTITY UNITS	UNIT COST		TOTAL COST				UNIT PRICE		\$507.98	
									UNIT OF MEASURE		EA	
Pile Disposal		25	\$50.00		\$1,250.00				OH&P 25%		\$635	
					\$0.00							
					\$0.00							
					\$0.00							
					\$0.00							
					\$0.00							
BARE UNIT COST \$50.00		TOTAL COST \$1,250.00										
LABOR CLASSIFICATION	WORK TO PERFORM	TOTAL MEN	TOTAL HOURS	HRLY RATE	TOTAL COST	OWN EQUIPMENT	WORK TO PERFORM	FUEL GAL.	TOTAL UNITS	TOTAL HOURS	HRLY RATE	TOTAL COST
Crane Operator		1	10	\$51.00	\$510.00			0		0	\$0.00	\$0.00
Operator		2	10	\$46.00	\$920.00			0		0	\$0.00	\$0.00
Oiler		1	10	\$46.00	\$460.00			0		0	\$0.00	\$0.00
Laborer		3	10	\$37.00	\$1,110.00			0		0	\$0.00	\$0.00
								0		0	\$0.00	\$0.00
								0		0	\$0.00	\$0.00
								0		0	\$0.00	\$0.00
								0		0	\$0.00	\$0.00
								0		0	\$0.00	\$0.00
								0		0	\$0.00	\$0.00
								0		0	\$0.00	\$0.00
17% OT					\$510.00			0		0	\$0.00	\$0.00
BARE UNIT COST \$140.40		TOTAL LABOR COST \$3,510.00				BARE UNIT COS \$0.00		0		TOTAL SES COST \$0.00		
MATERIAL / SERVICES		QUANTITY UNITS	UNIT COST	UNIT OF MEAS.	TOTAL COST	RENTAL EQUIP	WORK TO PERFORM	FUEL GAL.	TOTAL UNITS	TOTAL HOURS	HRLY RATE	TOTAL COST
Fuel / Oil / Grease		345	\$ 4.00	GAL	\$1,380.00	150 Ton Crane		120	1	10	\$111.00	\$1,110.00
Equipment Repairs 7%					\$135.10	Barge 200x50		0	1	10	\$107.00	\$1,070.00
PPE		7	\$15.00		\$116.20	Tender 200 HP		20	1	10	\$16.00	\$160.00
Oil Boom (FT)		250	\$2.00		\$500.00	Tug 800 HP		150	1	10	\$60.00	\$600.00
Debris Curtain (FT)		250	\$5.00		\$1,250.00	Debris Barge		0	1	10	\$54.00	\$540.00
					\$0.00	ICE Vibratory		15	1	10	\$22.00	\$220.00
					\$0.00	Air compressor		20	1	10	\$5.00	\$50.00
					\$0.00	Welder/ Torch		20	1	10	\$22.00	\$220.00
					\$0.00			0		0	\$0.00	\$0.00
					\$0.00			0		0	\$0.00	\$0.00
					\$0.00			0		0	\$0.00	\$0.00
					\$0.00			0		0	\$0.00	\$0.00
					\$0.00			0		0	\$0.00	\$0.00
					\$0.00			0		0	\$0.00	\$0.00
					\$0.00			0		0	\$0.00	\$0.00
					\$0.00			0		0	\$0.00	\$0.00
TAX AT 8%					\$270.50	TAX AT 8%		0		0	\$0.00	\$317.60
BARE UNIT COST \$146.07		TOTAL MATERIAL COST \$3,651.80				BARE UNIT COS \$171.50		345		TOTAL RENTED EQUIP \$4,287.60		

DO NOT QUOTE OR CITE

This document is currently under review by US EPA and its federal, state, and tribal partners, and is subject to change in whole or in part.

Table 4. Pile Replacement

ESTIMATE WORKSHEET 3.3													
BID DATE		PROJECT LOCATION					DESCRIPTION OF ITEM					ITEM NO.	
												3.3	
TOTAL QUANTITY ON PROPOSAL	15 EA					HOURS PER SHIFT	SHIFTS PER DAY	DAYS PER WEEK	DAILY UNIT PRODUCTION RATE		DAYS REQ. TO COMPLETE		
						10	1	6	15		1		
ESTIMATE WORKSHEET		TOTAL LABOR		TOTAL MATERIAL		TOTAL EQUIPMENT	TOTAL RENTED EQUIPMENT		TOTAL SUB-CONTRACTOR		TOTAL		
		\$5,545.80		\$68,863.18			\$5,227.20		\$0.00		\$79,636.18		
GRAND TOTALS		\$5,545.80		\$68,863.18		\$0.00	\$5,227.20		\$0.00		\$79,636.18		
UNIT PRICES		\$369.72		\$4,590.88		\$0.00	\$348.48		\$0.00				
SUB-CONTRACTOR	WORK TO PERFORM	QUANTITY UNITS	UNIT COST		TOTAL COST				UNIT PRICE		\$5,309.08		
									UNIT OF MEASURE		EA		
									OH&P	25%	\$6,636		
BARE UNIT COST		\$0.00		TOTAL COST		\$0.00							
LABOR CLASSIFICATION	WORK TO PERFORM	TOTAL MEN	TOTAL HOURS	HRLY RATE	TOTAL COST	OWN EQUIPMENT	WORK TO PERFORM	FUEL GALS.	TOTAL UNITS	TOTAL HOURS	HRLY RATE	TOTAL COST	
Crane Operator		1	10	\$51.00	\$510.00			0		0	\$0.00	\$0.00	
Operator		3	10	\$46.00	\$1,380.00			0		0	\$0.00	\$0.00	
Oiler		2	10	\$50.00	\$1,000.00			0		0	\$0.00	\$0.00	
Laborer		5	10	\$37.00	\$1,850.00			0		0	\$0.00	\$0.00	
								0		0	\$0.00	\$0.00	
								0		0	\$0.00	\$0.00	
								0		0	\$0.00	\$0.00	
								0		0	\$0.00	\$0.00	
								0		0	\$0.00	\$0.00	
								0		0	\$0.00	\$0.00	
								0		0	\$0.00	\$0.00	
17% OT					\$805.80			0		0	\$0.00	\$0.00	
BARE UNIT COST		\$369.72		TOTAL LABOR COST		\$5,545.80		BARE UNIT COS \$0.00		0		TOTAL SES COST \$0.00	
MATERIAL / SERVICES		QUANTITY UNITS	UNIT COST	UNIT OF MEAS.	TOTAL COST	RENTAL EQUIP	WORK TO PERFORM	FUEL GALS.	TOTAL UNITS	TOTAL HOURS	HRLY RATE	TOTAL COST	
Fuel / Oil / Grease		425	\$ 4.00	GAL	\$1,700.00	150 Ton Crane		120	1	10	\$111.00	\$1,110.00	
Equipment Repairs 7%					\$196.00	Barge 200x50		0	1	10	\$107.00	\$1,070.00	
PPE		11	\$15.00		\$116.20	Tender 200 HP		20	1	10	\$16.00	\$160.00	
Oil Boom		250	\$2.00		\$500.00	Tug 800 HP		150	1	10	\$60.00	\$600.00	
Debris Curtain		250	\$5.00		\$1,250.00	Debris Barge		0	1	10	\$54.00	\$540.00	
12" Dia. Replacement Pile		15	\$4,000.00		\$60,000.00	ICE Vibratory		15	1	10	\$22.00	\$220.00	
					\$0.00	Air compressor		20	1	10	\$5.00	\$50.00	
					\$0.00	Welder/ Torch		20	1	10	\$22.00	\$220.00	
					\$0.00	100 Ton Crane		80	1	10	\$87.00	\$870.00	
					\$0.00			0		0	\$0.00	\$0.00	
					\$0.00			0		0	\$0.00	\$0.00	
					\$0.00			0		0	\$0.00	\$0.00	
					\$0.00			0		0	\$0.00	\$0.00	
					\$0.00			0		0	\$0.00	\$0.00	
					\$0.00			0		0	\$0.00	\$0.00	
TAX AT 8%					\$5,100.98	TAX AT 8%		0		0	\$0.00	\$387.20	
BARE UNIT COST		\$4,590.88		TOTAL MATERIAL COST		\$68,863.18		BARE UNIT COS		\$348.48		425	
												TOTAL RENTED EQUIP \$5,227.20	

DO NOT QUOTE OR CITE

This document is currently under review by US EPA and its federal, state, and tribal partners, and is subject to change in whole or in part.

Table 5. Temporary Dock Relocation

ESTIMATE WORKSHEET 3.4													
BID DATE		PROJECT LOCATION					DESCRIPTION OF ITEM					ITEM NO.	
												3.4	
TOTAL QUANTITY ON PROPOSAL	1 Dock						HOURS PER SHIFT	SHIFTS PER DAY	DAYS PER WEEK	DAILY UNIT PRODUCTION RATE		DAYS REQ. TO COMPLETE	
QUANTITY							10	1	6	1		1	
ESTIMATE WORKSHEET		TOTAL LABOR			TOTAL MATERIAL		TOTAL EQUIPMENT	TOTAL RENTED EQUIPMENT		TOTAL SUB-CONTRACTOR		TOTAL	
		\$4,914.00			\$3,793.50			\$4,460.40		\$58,170.55		\$71,338.45	
GRAND TOTALS		\$4,914.00			\$3,793.50		\$0.00	\$4,460.40		\$58,170.55		\$71,338.45	
UNIT PRICES		\$4,914.00			\$3,793.50		\$0.00	\$4,460.40		\$58,170.55			
SUB-CONTRACTOR	WORK TO PERFORM	QUANTITY UNITS	UNIT COST		TOTAL COST					UNIT PRICE		\$71,338.45	
										UNIT OF MEASURE		Dock	
10 Pile Replacement		10	\$5,309.08		\$53,090.78					OH&P	25%	\$89,173	
10 Pile Removal		10	\$507.98		\$5,079.76								
					\$0.00								
					\$0.00								
					\$0.00								
					\$0.00								
BARE UNIT COST		\$58,170.55	TOTAL COST			\$58,170.55							
LABOR CLASSIFICATION	WORK TO PERFORM	TOTAL MEN	TOTAL HOURS	HRLY RATE	TOTAL COST	OWN EQUIPMENT	WORK TO PERFORM	FUEL GALS.	TOTAL UNITS	TOTAL HOURS	HRLY RATE	TOTAL COST	
Crane Operator		1	10	\$51.00	\$510.00			0		0	\$0.00	\$0.00	
Operator		3	10	\$46.00	\$1,380.00			0		0	\$0.00	\$0.00	
Oiler		1	10	\$46.00	\$460.00			0		0	\$0.00	\$0.00	
Laborer		5	10	\$37.00	\$1,850.00			0		0	\$0.00	\$0.00	
								0		0	\$0.00	\$0.00	
								0		0	\$0.00	\$0.00	
								0		0	\$0.00	\$0.00	
								0		0	\$0.00	\$0.00	
								0		0	\$0.00	\$0.00	
								0		0	\$0.00	\$0.00	
								0		0	\$0.00	\$0.00	
17% OT					\$714.00			0		0	\$0.00	\$0.00	
BARE UNIT COST		\$4,914.00	TOTAL LABOR COST			\$4,914.00		BARE UNIT COS \$0.00		0		TOTAL SES COST \$0.00	
MATERIAL / SERVICES		QUANTITY UNITS	UNIT COST	UNIT OF MEAS.	TOTAL COST	RENTAL EQUIP	WORK TO PERFORM	FUEL GALS.	TOTAL UNITS	TOTAL HOURS	HRLY RATE	TOTAL COST	
Fuel / Oil / Grease		375	\$	4.00	\$1,500.00	150 Ton Crane		120	1	10	\$111.00	\$1,110.00	
Equipment Repairs 7%					\$146.30	Barge 200x50		0	1	10	\$107.00	\$1,070.00	
PPE		10	\$15.00		\$116.20	Tender 200 HP		20	1	10	\$16.00	\$160.00	
Oil Boom		250	\$2.00		\$500.00	Tug 800 HP		150	1	10	\$60.00	\$600.00	
Debris Curtain		250	\$5.00		\$1,250.00	Pile Barge		0	1	10	\$54.00	\$540.00	
					\$0.00	ICE Vibratory		15	1	10	\$22.00	\$220.00	
					\$0.00	Air compressor		20	1	10	\$5.00	\$50.00	
					\$0.00	Welder/ Torch		20	1	10	\$22.00	\$220.00	
					\$0.00	Forklift		30	1	10	\$16.00	\$160.00	
					\$0.00			0		0	\$0.00	\$0.00	
					\$0.00			0		0	\$0.00	\$0.00	
					\$0.00			0		0	\$0.00	\$0.00	
					\$0.00			0		0	\$0.00	\$0.00	
					\$0.00			0		0	\$0.00	\$0.00	
					\$0.00			0		0	\$0.00	\$0.00	
TAX AT 8%					\$281.00	TAX AT 8%		0		0	\$0.00	\$330.40	
BARE UNIT COST		\$3,793.50	TOTAL MATERIAL COST			\$3,793.50		BARE UNIT COS \$4,460.40		375		TOTAL RENTED EQUIP \$4,460.40	

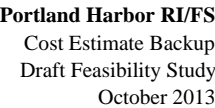
DO NOT QUOTE OR CITE

This document is currently under review by US EPA and its federal, state, and tribal partners, and is subject to change in whole or in part.

Table 6. Temporary Sheetpile Walls

ESTIMATE WORKSHEET 5.2													
Temp. Sheet Pile Walls													
BID DATE		PROJECT LOCATION					DESCRIPTION OF ITEM					ITEM NO.	
												5.2	
						PRODUCTION DATA							
TOTAL QUANTITY ON PROPOSAL	14 LF	3 pairs per day				HOURS PER SHIFT	SHIFTS PER DAY	DAYS PER WEEK	DAILY UNIT PRODUCTION RATE		DAYS REQ. TO COMPLETE		
QUANTITY		Assume sheets 80'				10	1	6	14		1		
ESTIMATE WORKSHEET		TOTAL LABOR		TOTAL MATERIAL		TOTAL EQUIPMENT	TOTAL RENTED EQUIPMENT		TOTAL SUB-CONTRACTOR		TOTAL		
WORKSHEET 5.2		\$4,800.00		\$1,756.51			\$5,130.00		\$14,675.28		\$26,362		
											\$0		
											\$0		
											\$0		
GRAND TOTALS		\$4,800.00		\$1,756.51		\$0.00	\$5,130.00		\$14,675.28		\$26,362		
UNIT PRICES		\$355.56		\$130.11		\$0.00	\$380.00		\$1,087.06				
SUB-CONTRACTOR	WORK TO PERFORM	QUANTITY UNITS	UNIT COST		TOTAL COST				UNIT PRICE		\$1,953		
									UNIT OF MEASURE		LF		
Purchase and deliver steel sheets		14	\$1,082		\$14,601				OH&P 25%		\$2,440		
Remove sheet pile wall		14	\$433		\$5,843								
Salvage Cost		14	-\$427		-\$5,769								
					\$0								
					\$0								
					\$0								
BARE UNIT COST		\$1,087.06	TOTAL COST			\$14,675.28							
LABOR CLASSIFICATION	WORK TO PERFORM	TOTAL MEN	TOTAL HOURS	HRLY RATE	TOTAL COST	OWN EQUIPMENT	WORK TO PERFORM	FUEL GALS.	TOTAL UNITS	TOTAL HOURS	HRLY RATE	TOTAL COST	
Laborer		8	10	\$37.00	\$2,960.00			0		0	\$0.00	\$0.00	
Operator		4	10	\$46.00	\$1,840.00			0		0	\$0.00	\$0.00	
			0	\$0.00	\$0.00			0		0	\$0.00	\$0.00	
			0	\$0.00	\$0.00			0		0	\$0.00	\$0.00	
			0	\$0.00	\$0.00			0		0	\$0.00	\$0.00	
			0	\$0.00	\$0.00			0		0	\$0.00	\$0.00	
			0	\$0.00	\$0.00			0		0	\$0.00	\$0.00	
			0	\$0.00	\$0.00			0		0	\$0.00	\$0.00	
			0	\$0.00	\$0.00			0		0	\$0.00	\$0.00	
			0	\$0.00	\$0.00			0		0	\$0.00	\$0.00	
			0	\$0.00	\$0.00			0		0	\$0.00	\$0.00	
17% OT			0		\$0.00			0		0	\$0.00	\$0.00	
BARE UNIT COST		\$0.00	TOTAL LABOR COST			\$4,800.00	BARE UNIT COS \$0.00		0	TOTAL SES COST			\$0.00
MATERIAL / SERVICES		QUANTITY UNITS	UNIT COST		TOTAL COST	RENTAL EQUIP	WORK TO PERFORM	FUEL GALS.	TOTAL UNITS	TOTAL HOURS	HRLY RATE	TOTAL COST	
Fuel / Oil / Grease		345	\$ 4.00	GAL	\$1,380.00	150 Ton Crane		120	1	10	\$111.00	\$1,110.00	
Equipment Repairs 7%					\$152.60	Barge 200x50		0	1	10	\$107.00	\$1,070.00	
PPE		12	\$15.00		\$93.80	Tender 200 HP		20	1	10	\$16.00	\$160.00	
					\$0.00	Tug 800 HP		150	1	10	\$60.00	\$600.00	
					\$0.00	ICE Vibratory		15	1	10	\$22.00	\$220.00	
					\$0.00	Air compressor		20	1	10	\$47.00	\$470.00	
					\$0.00	Welder/ Torch		20	1	10	\$5.00	\$50.00	
					\$0.00	Material Barge		0	1	10	\$107.00	\$1,070.00	
					\$0.00			0		0	\$0.00	\$0.00	
					\$0.00			0		0	\$0.00	\$0.00	
					\$0.00			0		0	\$0.00	\$0.00	
					\$0.00			0		0	\$0.00	\$0.00	
					\$0.00			0		0	\$0.00	\$0.00	
					\$0.00			0		0	\$0.00	\$0.00	
TAX AT 8%					\$130.11	TAX AT 8%		0		0	\$0.00	\$380.00	
BARE UNIT COST		\$130.11	TOTAL MATERIAL COST			\$1,756.51	BARE UNIT COS \$380.00		345	TOTAL RENTED EQUIP			\$5,130.00





ESTIMATE WORKSHEET 5.1													
SILT CURTAIN INSTALLATION													
BID DATE		PROJECT LOCATION					DESCRIPTION OF ITEM					ITEM NO.	
												5.1	
						PRODUCTION DATA							
TOTAL QUANTITY ON PROPOSAL		750 LF					HOURS PER SHIFT	SHIFTS PER DAY	DAYS PER WEEK	DAILY UNIT PRODUCTION RATE		DAYS REQ. TO COMPLETE	
QUANTITY						10	1	6	750		1		
ESTIMATE WORKSHEET		TOTAL LABOR		TOTAL MATERIAL		TOTAL EQUIPMENT	TOTAL RENTED EQUIPMENT		TOTAL SUB-CONTRACTOR		TOTAL		
WORKSHEET 5.1		\$2,808.00		\$44,788.90			\$1,252.80		\$2,800.00		\$51,649.70		
											\$0.00		
											\$0.00		
											\$0.00		
GRAND TOTALS		\$2,808.00		\$44,788.90		\$0.00	\$1,252.80		\$2,800.00		\$51,649.70		
UNIT PRICES		\$3.74		\$59.72		\$0.00	\$1.67		\$3.73				
SUB-CONTRACTOR		WORK TO PERFORM	QUANTITY UNITS	UNIT COST		TOTAL COST					UNIT PRICE	\$68.87	
											UNIT OF MEASURE	LF	
IWT Delivery			1	\$2,800.00		\$2,800.00					OH&P 25%	\$86	
						\$0.00							
						\$0.00							
						\$0.00							
						\$0.00							
						\$0.00							
BARE UNIT COST		\$0.00	TOTAL COST			\$2,800.00							
LABOR CLASSIFICATION		WORK TO PERFORM	TOTAL MEN	TOTAL HOURS	HRLY RATE	TOTAL COST	OWN EQUIPMENT	WORK TO PERFORM	FUEL GALS.	TOTAL UNITS	TOTAL HOURS	HRLY RATE	TOTAL COST
Laborer			4	10	\$37.00	\$1,480.00			0		0	\$0.00	\$0.00
Operator			2	10	\$46.00	\$920.00			0		0	\$0.00	\$0.00
				0	\$0.00	\$0.00			0		0	\$0.00	\$0.00
				0	\$0.00	\$0.00			0		0	\$0.00	\$0.00
				0	\$0.00	\$0.00			0		0	\$0.00	\$0.00
				0	\$0.00	\$0.00			0		0	\$0.00	\$0.00
				0	\$0.00	\$0.00			0		0	\$0.00	\$0.00
				0	\$0.00	\$0.00			0		0	\$0.00	\$0.00
				0	\$0.00	\$0.00			0		0	\$0.00	\$0.00
				0	\$0.00	\$0.00			0		0	\$0.00	\$0.00
				0	\$0.00	\$0.00			0		0	\$0.00	\$0.00
17% OT				0	\$0.00	\$0.00			0		0	\$0.00	\$0.00
BARE UNIT COST		\$0.00	TOTAL LABOR COST			\$2,808.00	BARE UNIT COS \$0.00		0	TOTAL SES COST		\$0.00	
MATERIAL / SERVICES		QUANTITY UNITS	UNIT COST		TOTAL COST	RENTAL EQUIP	WORK TO PERFORM	FUEL GALS.	TOTAL UNITS	TOTAL HOURS	HRLY RATE	TOTAL COST	
FOG GAL		45	\$4.00		\$180.00	Work Boat		15	2	10	\$56.00	\$1,120.00	
Equipment Repair 7%		1	\$81.20		\$81.20	Forklift		30	1	2.5	\$16.00	\$40.00	
PPE		6	\$15.00		\$90.00			0		0	\$0.00	\$0.00	
Turbidity Curtains		800	\$51.40		\$41,12								

This document is currently under review by US EPA and its federal, state, and tribal partners, and is subject to change in whole or in part.

Table 8. Open Water Dredging and Transport

ESTIMATE WORKSHEET 4.1												
OPEN WATER DREDGING AND TRANSPORT												
BID DATE	PROJECT LOCATION					DESCRIPTION OF ITEM					ITEM NO.	
											4.1	
						PRODUCTION DATA						
TOTAL QUANTITY ON PROPOSAL	700 CY					HOURS PER SHIFT	SHIFTS PER DAY	DAYS PER WEEK	DAILY UNIT PRODUCTION RATE		DAYS REQ. TO COMPLETE	
QUANTITY						10	1	6	700		1	
ESTIMATE WORKSHEET		TOTAL LABOR		TOTAL MATERIAL		TOTAL EQUIPMENT	TOTAL RENTED EQUIPMENT		TOTAL SUB-CONTRACTOR		TOTAL	
WORKSHEET 4.1		\$2,047.50		\$1,425.82		\$0.00	\$11,944.80		\$3,500.00		\$18,918.12	
											\$0.00	
											\$0.00	
											\$0.00	
GRAND TOTALS		\$2,047.50		\$1,425.82		\$0.00	\$11,944.80		\$3,500.00		\$18,918.12	
UNIT PRICES		\$2.93		\$2.04		\$0.00	\$17.06		\$5.00			
SUB-CONTRACTOR	WORK TO PERFORM	QUANTITY UNITS	UNIT COST		TOTAL COST					UNIT PRICE	\$27.03	
SURVEY/CREW/BOAT			\$12,000.00	WK	\$2,000					UNIT OF MEASURE	CY	
SCOW HAUL TO OFFLOAD FACILITY			\$1,500.00	TRIP	\$1,500					OH&P 25%	\$33.8	
BARE UNIT COST		\$0.00	TOTAL COST		\$3,500							
LABOR CLASSIFICATION	WORK TO PERFORM	TOTAL MEN	TOTAL HOURS	HRLY RATE	TOTAL COST	OWN EQUIPMENT	WORK TO PERFORM	FUEL GALS.	TOTAL UNITS	TOTAL HOURS	HRLY RATE	TOTAL COST
Crane Operator		1	10	\$51.00	\$510			0		0	\$0.00	\$0.00
Oiler		1	10	\$50.00	\$500			0		0	\$0.00	\$0.00
Work Boat Laborer		1	10	\$37.00	\$370			0		0	\$0.00	\$0.00
Laborer		4	10	\$37.00	\$370			0		0	\$0.00	\$0.00
					\$0			0		0	\$0.00	\$0.00
					\$0			0		0	\$0.00	\$0.00
					\$0			0		0	\$0.00	\$0.00
					\$0			0		0	\$0.00	\$0.00
					\$0			0		0	\$0.00	\$0.00
					\$0			0		0	\$0.00	\$0.00
					\$0			0		0	\$0.00	\$0.00
17% OT					\$298			0		0	\$0.00	\$0.00
BARE UNIT COST		\$4.73	TOTAL LABOR COST		\$2,048	BARE UNIT COS \$0.00		0	TOTAL SES COST \$0.00			
MATERIAL / SERVICES		QUANTITY UNITS	UNIT COST		TOTAL COST	RENTAL EQUIP	WORK TO PERFORM	FUEL GALS.	TOTAL UNITS	TOTAL HOURS	HRLY RATE	TOTAL COST
FOG	GAL	140	\$4.00		\$560.00	Derrick Rig		125	1	10	\$776.00	\$7,760.00
Equipment Repair	7%	1	\$655.20		\$655.20	Material Scow		0	2	20	\$85.00	\$1,700.00
PPE		7	\$15.00		\$105.00	Work Boat		15	2	20	\$56.00	\$1,120.00
					\$0.00	Clam Bucket		0	1	10	\$48.00	\$480.00
					\$0.00			0		0	\$0.00	\$0.00
					\$0.00			0		0	\$0.00	\$0.00
					\$0.00			0		0	\$0.00	\$0.00
					\$0.00			0		0	\$0.00	\$0.00
					\$0.00			0		0	\$0.00	\$0.00
					\$0.00			0		0	\$0.00	\$0.00
					\$0.00			0		0	\$0.00	\$0.00
					\$0.00			0		0	\$0.00	\$0.00
					\$0.00			0		0	\$0.00	\$0.00
					\$0.00			0		0	\$0.00	\$0.00
					\$0.00			0		0	\$0.00	\$0.00
TAX AT 8%					\$105.62	TAX AT 8%		0		0	\$0.00	\$884.80
BARE UNIT COST		\$2.04	TOTAL MATERIAL COST		\$1,425.82	BARE UNIT COS \$17.06		140	TOTAL RENTED EQUIP \$11,944.80			

Table 9. Confined Dredging

ESTIMATE WORKSHEET 4.3												
CONFINED AREA DREDGING & TRANSPORT												
BID DATE		PROJECT LOCATION					DESCRIPTION OF ITEM					ITEM NO.
												4.3
						PRODUCTION DATA						
TOTAL QUANTITY ON PROPOSAL	300 CY					HOURS PER SHIFT	SHIFTS PER DAY	DAYS PER WEEK	DAILY UNIT PRODUCTION RATE		DAYS REQ. TO COMPLETE	
QUANTITY						10	1	6	300		1	
ESTIMATE WORKSHEET		TOTAL LABOR		TOTAL MATERIAL		TOTAL EQUIPMENT	TOTAL RENTED EQUIPMENT		TOTAL SUB-CONTRACTOR		TOTAL	
WORKSHEET 4.3		\$2,082.60		\$546.26		\$0.00	\$6,328.80		\$2,500.00		\$11,457.66	
											\$0.00	
											\$0.00	
GRAND TOTALS		\$2,082.60		\$546.26		\$0.00	\$6,328.80		\$2,500.00		\$11,457.66	
UNIT PRICES		\$6.94		\$1.82		\$0.00	\$21.10		\$8.33			
SUB-CONTRACTOR	WORK TO PERFORM	QUANTITY UNITS	UNIT COST		TOTAL COST				UNIT PRICE		\$38.19	
					UNIT OF MEASURE				CY			
SURVEY/CREW/BOAT			\$12,000.00	WK	\$2,000							
SCOW HAUL TO OFFLOAD FACILITY			\$1,500.00	TRIP	\$500							
					\$0.00							
					\$0.00							
					\$0.00							
					\$0.00							
BARE UNIT COST		\$8.33	TOTAL COST			\$2,500.00						
LABOR CLASSIFICATION	WORK TO PERFORM	TOTAL MEN	TOTAL HOURS	HRLY RATE	TOTAL COST	OWN EQUIPMENT	WORK TO PERFORM	FUEL GALS.	TOTAL UNITS	TOTAL HOURS	HRLY RATE	TOTAL COST
Dredge Operator	Dredge	1	10	\$54.00	\$540.00			0	0	10	\$45.00	\$0.00
Deck Hand	Deck Hand	2	20	\$37.00	\$740.00			0	0	10	\$100.00	\$0.00
Boat Operator	Wrk Boat	1	10	\$50.00	\$500.00			0	0	10	\$10.00	\$0.00
			0	\$0.00	\$0.00			0		0	\$0.00	\$0.00
			0	\$0.00	\$0.00			0		0	\$0.00	\$0.00
			0	\$0.00	\$0.00			0		0	\$0.00	\$0.00
			0	\$0.00	\$0.00			0		0	\$0.00	\$0.00
			0	\$0.00	\$0.00			0		0	\$0.00	\$0.00
			0	\$0.00	\$0.00			0		0	\$0.00	\$0.00
			0	\$0.00	\$0.00			0		0	\$0.00	\$0.00
			0	\$0.00	\$0.00			0		0	\$0.00	\$0.00
			0	\$0.00	\$0.00			0		0	\$0.00	\$0.00
17% OT			0		\$302.60			0		0	\$0.00	\$0.00
BARE UNIT COST		\$6.94	TOTAL LABOR COST			BARE UNIT COS \$0.00		0		TOTAL SES COST \$0.00		
MATERIAL / SERVICES		QUANTITY UNITS	UNIT COST		TOTAL COST	RENTAL EQUIP	WORK TO PERFORM	FUEL GALS.	TOTAL UNITS	TOTAL HOURS	HRLY RATE	TOTAL COST
FOG	GAL	95	\$4.00		\$380.00	PC 600 Long Front	Load	60	1	10	\$82.00	\$820.00
PPE		4	\$15.00		\$60.00	Push Boat	Move	20	1	10	\$40.00	\$400.00
Equipment Repairs	7%	1	\$65.80		\$65.80	Work Boat		15	1	10	\$56.00	\$560.00
					\$0.00	Barge (10'*40')		0	4	40	\$31.00	\$1,240.00
					\$0.00	Scows		0	4	40	\$68.00	\$2,720.00
					\$0.00	Spuds		0	4	40	\$2.00	\$80.00
					\$0.00	Spud wells		0	4	40	\$1.00	\$40.00
					\$0.00			0		0	\$0.00	\$0.00
					\$0.00			0		0	\$0.00	\$0.00
					\$0.00			0		0	\$0.00	\$0.00
					\$0.00			0		0	\$0.00	\$0.00
					\$0.00			0		0	\$0.00	\$0.00
					\$0.00			0		0	\$0.00	\$0.00
					\$0.00			0		0	\$0.00	\$0.00
					\$0.00			0		0	\$0.00	\$0.00
TAX at 8%					\$40.46	TAX at 8%		0		0	\$0.00	\$468.80
BARE UNIT COST		\$1.82	TOTAL MATERIAL COST			BARE UNIT COS		\$21.10	95	TOTAL RENTED EQUIP \$6,328.80		

Table 10. Dredging from Shore and Transport

ESTIMATE WORKSHEET 4.2													
DREDGING FROM SHORE & TRANSPORT													
BID DATE		PROJECT LOCATION					DESCRIPTION OF ITEM					ITEM NO.	
												4.2	
						PRODUCTION DATA							
TOTAL QUANTITY ON PROPOSAL		300 CY					HOURS PER SHIFT	SHIFTS PER Day	DAYS PER WEEK	DAILY UNIT PRODUCTION RATE		DAYS REQ. TO COMPLETE	
QUANTITY													
						10	1	6	300		1		
ESTIMATE WORKSHEET				TOTAL LABOR		TOTAL MATERIAL		TOTAL EQUIPMENT		TOTAL RENTED EQUIPMENT		TOTAL SUB-CONTRACTOR	
WORKSHEET 4.2				\$3,568.50		\$3,501.36		\$0.00		\$2,916.00		\$0.00	
												\$9,985.86	
												\$0.00	
												\$0.00	
GRAND TOTALS				\$3,568.50		\$3,501.36		\$0.00		\$2,916.00		\$0.00	
UNIT PRICES				\$11.90		\$11.67		\$0.00		\$9.72		\$0.00	
SUB-CONTRACTOR		WORK TO PERFORM	QUANTITY UNITS	UNIT COST		TOTAL COST					UNIT PRICE		\$33.29
												UNIT OF MEASURE	
												OH&P 25%	
												\$41.6	

Table 14. Hydraulic Offloading

ESTIMATE WORKSHEET 6.5																
Hydraulic Offloading																
BID DATE		PROJECT LOCATION					DESCRIPTION OF ITEM				ITEM NO.					
											6.5					
						PRODUCTION DATA										
TOTAL QUANTITY ON PROPOSAL	1,500 CY					HOURS PER SHIFT	SHIFTS PER Day	DAYS PER WEEK	DAILY UNIT PRODUCTION RATE		DAYS REQ. TO COMPLETE					
QUANTITY						10	1	6	1,500		1					
ESTIMATE WORKSHEET		TOTAL LABOR			TOTAL MATERIAL		TOTAL EQUIPMENT	TOTAL RENTED EQUIPMENT		TOTAL SUB-CONTRACTOR		TOTAL				
WORKSHEET 6.5		\$2,421.90			\$954.40		\$0.00	\$3,358.80		\$0.00		\$6,735.10				
												\$0.00				
												\$0.00				
												\$0.00				
GRAND TOTALS		\$2,421.90			\$954.40		\$0.00	\$3,358.80		\$0.00		\$6,735.10				
UNIT PRICES		\$1.61			\$0.64		\$0.00	\$2.24		\$0.00						
SUB-CONTRACTOR	WORK TO PERFORM	QUANTITY UNITS	UNIT COST		TOTAL COST				UNIT PRICE		\$4.49					
									UNIT OF MEASURE		CY					
									OH&P	25%	\$5.6					
BARE UNIT COST		\$0.00		TOTAL COST		\$0.00										
LABOR CLASSIFICATION	WORK TO PERFORM	TOTAL MEN	TOTAL HOURS	HRLY RATE	TOTAL COST	OWN EQUIPMENT	WORK TO PERFORM	FUEL GALS.	TOTAL UNITS	TOTAL HOURS	HRLY RATE	TOTAL COST				
Operator	Offload	1	10	\$46.00	\$460.00			0		0	\$0.00	\$0.00				
Laborer	Offload	3	10	\$37.00	\$1,110.00			0		0	\$0.00	\$0.00				
Oiler	Oiler	1	10	\$50.00	\$500.00			0		0	\$0.00	\$0.00				
			0	\$0.00	\$0.00			0		0	\$0.00	\$0.00				
			0	\$0.00	\$0.00			0		0	\$0.00	\$0.00				
			0	\$0.00	\$0.00			0		0	\$0.00	\$0.00				
			0	\$0.00	\$0.00			0		0	\$0.00	\$0.00				
			0	\$0.00	\$0.00			0		0	\$0.00	\$0.00				
			0	\$0.00	\$0.00			0		0	\$0.00	\$0.00				
			0	\$0.00	\$0.00			0		0	\$0.00	\$0.00				
			0	\$0.00	\$0.00			0		0	\$0.00	\$0.00				
17% OT			0		\$351.90			0		0	\$0.00	\$0.00				
BARE UNIT COST		\$1.61		TOTAL LABOR COST		\$2,421.90		BARE UNIT COS \$0.00		0		TOTAL SES COST	\$0.00			
MATERIAL / SERVICES		QUANTITY UNITS		UNIT COST				TOTAL COST	RENTAL EQUIP	WORK TO PERFORM	FUEL GALS.	TOTAL UNITS	TOTAL HOURS	HRLY RATE	TOTAL COST	
FOG	GAL	160		\$4.00				\$640.00	100 Ton Crane	Offload	80	1	10	\$87.00	\$870.00	
EQUIPMENT REPAIRS	7%	1		\$168.70				\$168.70	High Solids Pump		40	1	10	\$47.00	\$470.00	
PPE		5		\$15.00				\$75.00	Diffuser Barge		0	1	10	\$107.00	\$1,070.00	
								\$0.00	Push Boat	Move	20	1	10	\$40.00	\$400.00	
								\$0.00	Pipe Welder		20	1	10	\$30.00	\$300.00	
								\$0.00			0		0	\$0.00	\$0.00	
								\$0.00			0		0	\$0.00	\$0.00	
								\$0.00			0		0	\$0.00	\$0.00	
								\$0.00			0		0	\$0.00	\$0.00	
								\$0.00			0		0	\$0.00	\$0.00	
								\$0.00			0		0	\$0.00	\$0.00	
								\$0.00			0		0	\$0.00	\$0.00	
								\$0.00			0		0	\$0.00	\$0.00	
								\$0.00			0		0	\$0.00	\$0.00	
								\$0.00			0		0	\$0.00	\$0.00	
								\$0.00			0		0	\$0.00	\$0.00	
TAX AT 8%								\$70.70	TAX AT 8%		0		0	\$0.00	\$248.80	
BARE UNIT COST		\$0.64		TOTAL MATERIAL COST		\$954.40		BARE UNIT COS		\$2.24		160		TOTAL RENTED EQUIP		\$3,358.80

DO NOT QUOTE OR CITE

This document is currently under review by US EPA and its federal, state, and tribal partners, and is subject to change in whole or in part.

Table 15. Open Water Capping

ESTIMATE WORKSHEET 7.1												
OPEN WATER CAPPING												
BID DATE		PROJECT LOCATION					DESCRIPTION OF ITEM					ITEM NO.
												7.1
						PRODUCTION DATA						
TOTAL QUANTITY ON PROPOSAL	1,500 Ton					HOURS PER SHIFT	SHIFTS PER DAY	DAYS PER WEEK	DAILY UNIT PRODUCTION RATE		DAYS REQ. TO COMPLETE	
QUANTITY						10	1	6	1,500		1	
ESTIMATE WORKSHEET		TOTAL LABOR		TOTAL MATERIAL		TOTAL EQUIPMENT	TOTAL RENTED EQUIPMENT		TOTAL SUB-CONTRACTOR		TOTAL	
WORKSHEET 7.1		\$3,545.10		\$2,066.69		\$0.00	\$13,510.80		\$2,000.00		\$21,122.59	
											\$0.00	
											\$0.00	
											\$0.00	
GRAND TOTALS		\$3,545.10		\$2,066.69		\$0.00	\$13,510.80		\$2,000.00		\$21,122.59	
UNIT PRICES		\$2.36		\$1.38		\$0.00	\$9.01		\$1.33			
SUB-CONTRACTOR	WORK TO PERFORM	QUANTITY UNITS	UNIT COST		TOTAL COST		Base (1500 Ton / day) Armor (1700 Ton / day)	UNIT PRICE		\$14.08		
					UNIT OF MEASURE			Ton				
	Survey/ Crew/ Boat			\$2,000.00	OH&P			25%	\$17.6			
				\$0.00	OH&P			25%	\$15.5			
				\$0.00								
					\$0.00							
					\$0.00							
BARE UNIT COST		\$0.00	TOTAL COST			\$2,000.00						
LABOR CLASSIFICATION	WORK TO PERFORM	TOTAL MEN	TOTAL HOURS	HRLY RATE	TOTAL COST	OWN EQUIPMENT	WORK TO PERFORM	FUEL GALS.	TOTAL UNITS	TOTAL HOURS	HRLY RATE	TOTAL COST
Crane Operator		1	10	\$51.00	\$510.00			0		0	\$0.00	\$0.00
Deck Hand		4	40	\$37.00	\$1,480.00			0		0	\$0.00	\$0.00
Tug Captain		1	10	\$54.00	\$540.00			0		0	\$0.00	\$0.00
Oiler		1	10	\$50.00	\$500.00			0		0	\$0.00	\$0.00
			0	\$0.00	\$0.00			0		0	\$0.00	\$0.00
			0	\$0.00	\$0.00			0		0	\$0.00	\$0.00
			0	\$0.00	\$0.00			0		0	\$0.00	\$0.00
			0	\$0.00	\$0.00			0		0	\$0.00	\$0.00
			0	\$0.00	\$0.00			0		0	\$0.00	\$0.00
			0	\$0.00	\$0.00			0		0	\$0.00	\$0.00
			0	\$0.00	\$0.00			0		0	\$0.00	\$0.00
			0	\$0.00	\$0.00			0		0	\$0.00	\$0.00
17% OT			0		\$515.10			0		0	\$0.00	\$0.00
BARE UNIT COST		\$2.36	TOTAL LABOR COST			\$3,545.10		BARE UNIT COS \$0.00		0	TOTAL SES COST \$0.00	
MATERIAL / SERVICES		QUANTITY UNITS	UNIT COST		TOTAL COST	RENTAL EQUIP	WORK TO PERFORM	FUEL GALS.	TOTAL UNITS	TOTAL HOURS	HRLY RATE	TOTAL COST
FOG	GAL	290	\$4.00		\$1,160.00	Derrick Rig		125	1	10	\$776.00	\$7,760.00
Equipment Repair	7%	1	\$663.60		\$663.60	Material Scow		0	3	30	\$85.00	\$2,550.00
PPE		6	\$15.00		\$90.00	Tug		150	1	10	\$60.00	\$600.00
					\$0.00	Work Boat		15	2	20	\$56.00	\$1,120.00
					\$0.00	Clam Bucket		0	1	10	\$48.00	\$480.00
					\$0.00			0		0	\$0.00	\$0.00
					\$0.00			0		0	\$0.00	\$0.00
					\$0.00			0		0	\$0.00	\$0.00
					\$0.00			0		0	\$0.00	\$0.00
					\$0.00			0		0	\$0.00	\$0.00
					\$0.00			0		0	\$0.00	\$0.00
					\$0.00			0		0	\$0.00	\$0.00
					\$0.00			0		0	\$0.00	\$0.00
					\$0.00			0		0	\$0.00	\$0.00
					\$0.00			0		0	\$0.00	\$0.00
					\$0.00			0		0	\$0.00	\$0.00
					\$0.00			0		0	\$0.00	\$0.00
					\$0.00			0		0	\$0.00	\$0.00
TAX AT 8%					\$153.09	TAX AT 8%		0		0	\$0.00	\$1,000.80
BARE UNIT COST		\$1.38	TOTAL MATERIAL COST			\$2,066.69		BARE UNIT COS \$9.01		290	TOTAL RENTED EQUIP \$13,510.80	

DO NOT QUOTE OR CITE

This document is currently under review by US EPA and its federal, state, and tribal partners, and is subject to change in whole or in part.

Table 19. Confined Underpier Capping

ESTIMATE WORKSHEET 7.2													
CONFINED AREA CAPPING													
BID DATE		PROJECT LOCATION					DESCRIPTION OF ITEM					ITEM NO.	
												7.2	
						PRODUCTION DATA							
TOTAL QUANTITY ON PROPOSAL	500 TON					HOURS PER SHIFT	SHIFTS PER DAY	DAYS PER WEEK	DAILY UNIT PRODUCTION RATE		DAYS REQ. TO COMPLETE		
QUANTITY						10	1	6	500		1		
ESTIMATE WORKSHEET		TOTAL LABOR		TOTAL MATERIAL		TOTAL EQUIPMENT	TOTAL RENTED EQUIPMENT		TOTAL SUB-CONTRACTOR		TOTAL		
WORKSHEET 7.2		\$3,159.00		\$1,439.53		\$0.00	\$7,894.80		\$2,000.00		\$14,493.33		
											\$0.00		
											\$0.00		
											\$0.00		
GRAND TOTALS		\$3,159.00		\$1,439.53		\$0.00	\$7,894.80		\$2,000.00		\$14,493.33		
UNIT PRICES		\$6.32		\$2.88		\$0.00	\$15.79		\$4.00				
SUB-CONTRACTOR	WORK TO PERFORM	QUANTITY UNITS	UNIT COST		TOTAL COST		Base (500 Ton / day) Armor (567 Ton/day)	UNIT COST		\$28.99			
Survey/ Crew/ Boat					\$2,000.00			UNIT OF MEASURE		TON			
					\$0.00			OH&P		25%	\$36.20		
					\$0.00			OH&P		25%	\$32.00		
					\$0.00								
					\$0.00								
BARE UNIT COST		\$4.00		TOTAL COST			\$2,000.00						
LABOR CLASSIFICATION	WORK TO PERFORM	TOTAL MEN	TOTAL HOURS	HRLY RATE	TOTAL COST	OWN EQUIPMENT	WORK TO PERFORM	FUEL GALS.	TOTAL UNITS	TOTAL HOURS	HRLY RATE	TOTAL COST	
600 Hoe Operator	Hoe	1	10	\$46.00	\$460.00			0	0	10	\$45.00	\$0.00	
Tug Captain		1	10	\$54.00	\$540.00			0	0	10	\$100.00	\$0.00	
Boat Operator		1	10	\$50.00	\$500.00			0	0	10	\$10.00	\$0.00	
Deck Hand		2	10	\$37.00	\$740.00			0		0	\$0.00	\$0.00	
Telebelt Operator	Place Cap	1	10	\$46.00	\$460.00			0		0	\$0.00	\$0.00	
			0	\$0.00	\$0.00			0		0	\$0.00	\$0.00	
			0	\$0.00	\$0.00			0		0	\$0.00	\$0.00	
			0	\$0.00	\$0.00			0		0	\$0.00	\$0.00	
			0	\$0.00	\$0.00			0		0	\$0.00	\$0.00	
			0	\$0.00	\$0.00			0		0	\$0.00	\$0.00	
			0	\$0.00	\$0.00			0		0	\$0.00	\$0.00	
17% OT			0		\$459.00			0		0	\$0.00	\$0.00	
BARE UNIT COST		\$6.32		TOTAL LABOR COST			\$3,159.00		BARE UNIT COS \$0.00		0		
		TOTAL SES COST			\$0.00								
MATERIAL / SERVICES		QUANTITY UNITS	UNIT COST		TOTAL COST	RENTAL EQUIP	WORK TO PERFORM	FUEL GALS.	TOTAL UNITS	TOTAL HOURS	HRLY RATE	TOTAL COST	
FOG	GAL	285	\$4.00		\$1,140.00	PC 600	Load	60	1	10	\$82.00	\$820.00	
Equipment Repairs	7%	1	\$102.90		\$102.90	Tug		150	1	10	\$16.00	\$160.00	
PPE		6	\$15.00		\$90.00	Work Boat		15	1	10	\$56.00	\$560.00	
						Barge		0	6	60	\$54.00	\$3,240.00	
					\$0.00	Scows		0	2	20	\$68.00	\$1,360.00	
					\$0.00	Push Boat	Move	20	1	10	\$40.00	\$400.00	
					\$0.00	Spuds		0	4	40	\$2.00	\$80.00	
					\$0.00	Spud wells		0	4	40	\$1.00	\$40.00	
					\$0.00	Telebelt		40	1	10	\$65.00	\$650.00	
					\$0.00			0	0	0	\$0.00	\$0.00	
					\$0.00			0	0	0	\$0.00	\$0.00	
					\$0.00			0		0	\$0.00	\$0.00	
					\$0.00			0		0	\$0.00	\$0.00	
					\$0.00			0		0	\$0.00	\$0.00	
					\$0.00			0		0	\$0.00	\$0.00	
TAX AT 8%					\$106.63	TAX at 8%		0		0	\$0.00	\$584.80	
BARE UNIT COST		\$2.88		TOTAL MATERIAL COST			\$1,439.53		BARE UNIT COS		\$15.79		
		TOTAL RENTED EQUIP			\$7,894.80								

Table 22. Confined Backfill Placement

ESTIMATE WORKSHEET 7.2.3												
BID DATE		PROJECT LOCATION					DESCRIPTION OF ITEM					ITEM NO.
												7.2.3
						PRODUCTION DATA						
TOTAL QUANTITY ON PROPOSAL	500 TON					HOURS PER SHIFT	SHIFTS PER DAY	DAYS PER WEEK	DAILY UNIT PRODUCTION RATE		DAYS REQ. TO COMPLETE	
QUANTITY						10	1	6	500		1	
ESTIMATE WORKSHEET		TOTAL LABOR		TOTAL MATERIAL		TOTAL EQUIPMENT	TOTAL RENTED EQUIPMENT		TOTAL SUB-CONTRACTOR		TOTAL	
WORKSHEET 7.2.3		\$3,159.00		\$1,439.53		\$0.00	\$7,894.80		\$2,000.00		\$14,493.33	
											\$0.00	
											\$0.00	
											\$0.00	
GRAND TOTALS		\$3,159.00		\$1,439.53		\$0.00	\$7,894.80		\$2,000.00		\$14,493.33	
UNIT PRICES		\$6.32		\$2.88		\$0.00	\$15.79		\$4.00			
SUB-CONTRACTOR	WORK TO PERFORM	QUANTITY UNITS	UNIT COST		TOTAL COST		Base (500 Ton / day)	UNIT COST		\$28.99		
Survey/ Crew/ Boat					\$2,000.00			UNIT OF MEASURE		TON		
					\$0.00			OH&P 25%		\$36.30		
					\$0.00							
					\$0.00							
					\$0.00							
BARE UNIT COST \$4.00		TOTAL COST \$2,000.00										
LABOR CLASSIFICATION	WORK TO PERFORM	TOTAL MEN	TOTAL HOURS	HRLY RATE	TOTAL COST	OWN EQUIPMENT	WORK TO PERFORM	FUEL GALS.	TOTAL UNITS	TOTAL HOURS	HRLY RATE	TOTAL COST
600 Hoe Operator	Hoe	1	10	\$46.00	\$460.00			0	0	10	\$45.00	\$0.00
Tug Captain		1	10	\$54.00	\$540.00			0	0	10	\$100.00	\$0.00
Boat Operator		1	10	\$50.00	\$500.00			0	0	10	\$10.00	\$0.00
Deck Hand		2	10	\$37.00	\$740.00			0		0	\$0.00	\$0.00
Telebelt Operator	Place Cap	1	10	\$46.00	\$460.00			0		0	\$0.00	\$0.00
			0	\$0.00	\$0.00			0		0	\$0.00	\$0.00
			0	\$0.00	\$0.00			0		0	\$0.00	\$0.00
			0	\$0.00	\$0.00			0		0	\$0.00	\$0.00
			0	\$0.00	\$0.00			0		0	\$0.00	\$0.00
			0	\$0.00	\$0.00			0		0	\$0.00	\$0.00
			0	\$0.00	\$0.00			0		0	\$0.00	\$0.00
17% OT			0		\$459.00			0		0	\$0.00	\$0.00
BARE UNIT COST \$6.32		TOTAL LABOR COST \$3,159.00				BARE UNIT COS \$0.00		0		TOTAL SES COST \$0.00		
MATERIAL / SERVICES		QUANTITY UNITS	UNIT COST		TOTAL COST	RENTAL EQUIP	WORK TO PERFORM	FUEL GALS.	TOTAL UNITS	TOTAL HOURS	HRLY RATE	TOTAL COST
FOG	GAL	285	\$4.00		\$1,140.00	PC 600	Load	60	1	10	\$82.00	\$820.00
Equipment Repairs	7%	1	\$102.90		\$102.90	Tug		150	1	10	\$16.00	\$160.00
PPE		6	\$15.00		\$90.00	Work Boat		15	1	10	\$56.00	\$560.00
						Barge		0	6	60	\$54.00	\$3,240.00
					\$0.00	Scows		0	2	20	\$68.00	\$1,360.00
					\$0.00	Push Boat	Move	20	1	10	\$40.00	\$400.00
					\$0.00	Spuds		0	4	40	\$2.00	\$80.00
					\$0.00	Spud wells		0	4	40	\$1.00	\$40.00
					\$0.00	Telebelt		40	1	10	\$65.00	\$650.00
					\$0.00			0	0	0	\$0.00	\$0.00
					\$0.00			0	0	0	\$0.00	\$0.00
					\$0.00			0		0	\$0.00	\$0.00
					\$0.00			0		0	\$0.00	\$0.00
					\$0.00			0		0	\$0.00	\$0.00
TAX AT 8%					\$106.63	TAX at 8%		0		0	\$0.00	\$584.80
BARE UNIT COST \$2.88		TOTAL MATERIAL COST \$1,439.53				BARE UNIT COS \$15.79		285		TOTAL RENTED EQUIP \$7,894.80		



Table 23. Organoclay Mat

ESTIMATE WORKSHEET 7.3													
ORGANOCLAY MAT													
BID DATE		PROJECT LOCATION					DESCRIPTION OF ITEM					ITEM NO.	
												7.3	
						PRODUCTION DATA							
TOTAL QUANTITY ON PROPOSAL	12,000 SF					HOURS PER SHIFT	SHIFTS PER DAY	DAYS PER WEEK	DAILY UNIT PRODUCTION RATE		DAYS REQ. TO COMPLETE		
QUANTITY						10	1	6	12,000		1		
ESTIMATE WORKSHEET		TOTAL LABOR		TOTAL MATERIAL		TOTAL EQUIPMENT	TOTAL RENTED EQUIPMENT		TOTAL SUB-CONTRACTOR		TOTAL		
		\$4,083.30		\$35,964.00		\$0.00	\$3,207.60		\$12,000.00		\$55,254.90		
											\$5,525.49		
											\$0.00		
											\$0.00		
GRAND TOTALS		\$4,083.30		\$35,964.00		\$0.00	\$3,207.60		\$12,000.00		\$60,780.39		
UNIT PRICES		\$0.34		\$3.00		\$0.00	\$0.27		\$1.00				
SUB-CONTRACTOR	WORK TO PERFORM	QUANTITY UNITS	UNIT COST		TOTAL COST		Open Confined (30% Open)		UNIT PRICE		\$5.07		
						UNIT OF MEASURE			SF				
Divers		1	\$10,000.00		\$10,000.00	OH&P			25%	\$6.30			
Survey/ Crew/ Boat					\$2,000.00	OH&P			25%	\$21.10			
					\$0.00								
					\$0.00								
					\$0.00								
					\$0.00								
BARE UNIT COST		\$1.00	TOTAL COST			\$12,000.00							
LABOR CLASSIFICATION	WORK TO PERFORM	TOTAL MEN	TOTAL HOURS	HRLY RATE	TOTAL COST	OWN EQUIPMENT	WORK TO PERFORM	FUEL GAL.	TOTAL UNITS	TOTAL HOURS	HRLY RATE	TOTAL COST	
Tug Captain		1	10	\$54.00	\$540.00			0		0	\$0.00	\$0.00	
Crane Operator		1	10	\$51.00	\$510.00			0		0	\$0.00	\$0.00	
Oiler		1	10	\$50.00	\$500.00			0		0	\$0.00	\$0.00	
Operator		1	10	\$46.00	\$460.00			0		0	\$0.00	\$0.00	
Labor		4	10	\$37.00	\$1,480.00			0		0	\$0.00	\$0.00	
			0	\$0.00	\$0.00			0		0	\$0.00	\$0.00	
			0	\$0.00	\$0.00			0		0	\$0.00	\$0.00	
			0	\$0.00	\$0.00			0		0	\$0.00	\$0.00	
			0	\$0.00	\$0.00			0		0	\$0.00	\$0.00	
			0	\$0.00	\$0.00			0		0	\$0.00	\$0.00	
			0	\$0.00	\$0.00			0		0	\$0.00	\$0.00	
17% OT			0		\$593.30			0		0	\$0.00	\$0.00	
BARE UNIT COST		\$0.34	TOTAL LABOR COST			BARE UNIT COS		\$0.00	0	TOTAL SES COST			\$0.00
MATERIAL / SERVICES		QUANTITY UNITS	UNIT COST		TOTAL COST	RENTAL EQUIP	WORK TO PERFORM	FUEL GAL.	TOTAL UNITS	TOTAL HOURS	HRLY RATE	TOTAL COST	
FOG GAL		195	\$4.00		\$780.00	TUG		150	1	10	\$60.00	\$600.00	
Reactive Core Mat (15% loss)		12,000	\$2.70		\$32,400.00	Crane w/ Barge		0	1	10	\$111.00	\$1,110.00	
PPE		8	\$15.00		\$120.00	Material Barge		0	1	10	\$54.00	\$540.00	
					\$0.00	Forklift		30	1	10	\$16.00	\$160.00	
					\$0.00	Work Boat		15	1	10	\$56.00	\$560.00	
					\$0.00			0		0	\$0.00	\$0.00	
					\$0.00			0		0	\$0.00	\$0.00	
					\$0.00			0		0	\$0.00	\$0.00	
					\$0.00			0		0	\$0.00	\$0.00	
					\$0.00			0		0	\$0.00	\$0.00	
					\$0.00			0		0	\$0.00	\$0.00	
					\$0.00			0		0	\$0.00	\$0.00	
					\$0.00			0		0	\$0.00	\$0.00	
					\$0.00			0		0	\$0.00	\$0.00	
					\$0.00			0		0	\$0.00	\$0.00	
					\$0.00			0		0	\$0.00	\$0.00	
					\$0.00			0		0	\$0.00	\$0.00	
					\$0.00			0		0	\$0.00	\$0.00	
					\$0.00			0		0	\$0.00	\$0.00	
					\$0.00			0		0	\$0.00	\$0.00	
					\$0.00			0		0	\$0.00	\$0.00	
					\$0.00			0		0	\$0.00	\$0.00	
					\$0.00			0		0	\$0.00	\$0.00	
					\$0.00			0		0	\$0.00	\$0.00	
					\$0.00			0		0	\$0.00	\$0.00	
					\$0.00			0		0	\$0.00	\$0.00	
					\$0.00			0		0	\$0.00	\$0.00	
					\$0.00			0		0	\$0.00	\$0.00	
					\$0.00			0		0	\$0.00	\$0.00	
					\$0.00			0		0	\$0.00	\$0.00	
					\$0.00			0		0	\$0.00	\$0.00	
					\$0.00			0		0	\$0.00	\$0.00	
					\$0.00			0		0	\$0.00	\$0.00	
					\$0.00			0		0	\$0.00	\$0.00	
					\$0.00			0		0	\$0.00	\$0.00	
					\$0.00			0		0	\$0.00	\$0.00	
					\$0.00			0		0	\$0.00	\$0.00	
					\$0.00			0		0	\$0.00	\$0.00	
					\$0.00			0		0	\$0.00	\$0.00	
					\$0.00			0		0	\$0.00	\$0.00	
					\$0.00			0		0	\$0.00	\$0.00	
					\$0.00			0		0	\$0.00	\$0.00	
					\$0.00			0		0	\$0.00	\$0.00	
					\$0.00			0		0	\$0.00	\$0.00	
					\$0.00			0		0	\$0.00	\$0.00	
					\$0.00			0					

Table 24. Upland Subtitle D Landfill Disposal Cost Buildup

Task	Unit	Quantity	Unit Cost	Total Cost	Basis/Notes
<b>Transload Facility Development</b>					
Transload facility permitting	LS	1	\$40,000	\$5,000	(1); Based on past experience normalized over total landfill disposal volume
Transload facility development	LS	1	\$7,500,000	\$863,000	(1,2); One time cost normalized over total estimated landfill disposal volume
Yearly property lease rate	ACRE	20	\$23,500	\$470,000	(3); Lease rate based on Port of Portland T6 public records.
Yearly gondola mobilization	Cars	500	\$4,000	\$2,000,000	(4); Car mobilization price from Waste Management
<b>Materials Handling and Stabilization</b>					
Materials handling from barge to upland stockpile	TON	345,000	\$6	\$2,070,000	(5); Offloading rate based on crane on dock and off-road trucks hauling to stockpile
Purchase Diatomaceous Earth (DE)	TON	17,250	\$94	\$1,622,000	Assumed 5% by weight mixing rate. DE price from Waste Management
Mix DE with dredged material to improve handling	TON	17,250	\$2	\$35,000	Cost based on end loader mixing DE and dredge material
Materials handling from stockpile to rail cars	TON	362,250	\$5	\$1,811,000	Cost assumes end loaders loading to rail cars on each side of stockpiles
Water treatment	1,000 gal	7,500	\$10	\$75,000	(6); Water treatment cost based on recent construction project.
<b>Transportation and Disposal</b>					
Rail transportation and tipping fee at Subtitle D landfill	TON	362,250	\$50	\$18,113,000	Price from Waste Management for unit train service.
<b>Inspection and Monitoring of Transload Facility</b>					
Labor inspections during operations	FTE	2.5	\$75,000	\$188,000	Assumes 7 people during 4 months of dredging and 1 during subsequent 2 months
Environmental monitoring direct costs during offloading	MONTH	4	\$15,000	\$60,000	Cost for boat, monitoring equipment and chemistry analysis
Reporting	Year	1	\$40,000	\$40,000	Based on past experience
<b>Total Estimated Cost</b>				<b>\$27,352,000</b>	
<b>Total Cubic Yards Handled Per Season</b>				<b>230,000</b>	(7)
<b>Total Tons Handled Per Season</b>				<b>345,000</b>	Assumes 1.5 tons/cy unit weight
<b>Estimated Cost Per Cubic Yard</b>				<b>\$119</b>	
<b>Estimated Cost Per Ton</b>				<b>\$79</b>	

**Notes:**

- (1) Assumed total dredge volume taken to upland landfill through life of facility: 2,000,000 cy  
 Alts B&C - ~200,000 to 1,260,000 cy (w/o in-water); 0 to 600,000 cy (w/ in-water)  
 Alts D&E - ~440,000 to 2,300,000 cy (w/o in-water); 0 to 600,000 cy (w/ in-water)  
 Alt F - ~2,200,000 to 6,698,000 cy (w/o in-water); 0 to 4,305,000 cy (w/ in-water)
- (2) Assumption for site development:
  - Pier/dock structure development/upgrade (~\$1.5M)
  - Addition of ~10,000 feet of new rail line & ~5 switches (~\$3.5M)
  - Creation of 12 to 15 acres of bermed stockpile areas holding up to 70,000 cy of sediment (~\$1M)
  - Mobilization of offloading equipment, off-road trucks, end loaders and other equipment (~\$0.5M)
  - Miscellaneous site improvements (utilities, water treatment, offices, etc.) (~\$1M)
- (3) Assumed another ~5 acres for support activities for total site need of 20 acres. Lease rate is yearly.
- (4) Assuming 3,000 to 5,000 tons/day loaded out, 100 tons/gondola, and 10-day turnaround produces 300 to 500 rail cars needed each year.
- (5) Assumes 230,000 cy/season and 1.5 tons/cy weight conversion.
- (6) Assumes 15-acre stockpile receiving 37 inches/year of rain over the 6-month stockpile time.
- (7) Assumes for transload volume per year:
  - 85 to 105 days of dredging (5 to 6 days/week) in a 120-day construction window
  - 700 cy/day/site and 2 to 3 cleanup sites being dredged at one time
  - 10 to 15 acres of 5-foot stockpiles can hold between 70,000 and 120,000 cy for shipping to the landfill after the dredging season is complete.

**DO NOT QUOTE OR CITE**

This document is currently under review by US EPA and its federal, state, and tribal partners, and is subject to change in whole or in part.

Table 25. Upland Subtitle C Landfill Disposal Cost Buildup

Task	Unit	Quantity	Unit Cost	Total Cost	Basis/Notes
<b>Transload Facility Development</b>					
Transload facility permitting	LS	1	\$40,000	\$0	(1); Based on past experience normalized over total landfill disposal volume
Transload facility development	LS	1	\$7,500,000	\$86,000	(1,2); One time cost normalized over total estimated landfill disposal volume
Yearly property lease rate	ACRE	0	\$23,500	\$0	(3); Lease rate based on Port of Portland T6 public records.
Yearly gondola mobilization	Cars	0	\$4,000	\$0	(4); Car mobilization price from Waste Management
<b>Materials Handling and Stabilization</b>					
Materials handling from barge to upland stockpile	TON	34,500	\$6	\$207,000	(5); Offloading rate based on crane on dock and off-road trucks hauling to stockpile
Purchase Diatomaceous Earth (DE)	TON	5,175	\$94	\$486,000	Assumed 15% by weight mixing rate. DE price from Waste Management
Mix DE with dredged material to improve handling	TON	5,175	\$2	\$10,000	Cost based on end loader mixing DE and dredge material
Materials handling from stockpile to rail cars	TON	39,675	\$5	\$198,000	Cost assumes end loaders loading to rail cars on each side of stockpiles
Water treatment	1,000 gal	0	\$10	\$0	(6); Water treatment cost based on recent construction project.
<b>Transportation and Disposal</b>					
Rail transportation and tipping fee at Subtitle D landfill	TON	39,675	\$170	\$6,758,000	Price from Waste Management for truck transport and converted to unit train service.
<b>Inspection and Monitoring of Transload Facility</b>					
Labor inspections during operations	FTE	0.6	\$75,000	\$44,000	Assumes 7 people during roughly 1 month of offloading throughout the project
Environmental monitoring direct costs during offloading	MONTH	1	\$15,000	\$15,000	Cost for boat, monitoring equipment and chemistry analysis
Reporting	Year	0.25	\$40,000	\$10,000	Only a quarter of costs allocated to Subtitle C work
<b>Total Estimated Cost</b>				<b>\$7,814,000</b>	
<b>Total Cubic Yards Handled Per Season</b>				<b>23,000</b>	(7)
<b>Total Tons Handled Per Season</b>				<b>34,500</b>	Assumes 1.5 tons/cy unit weight
<b>Estimated Cost Per Cubic Yard</b>				<b>\$340</b>	
<b>Estimated Cost Per Ton</b>				<b>\$226</b>	

**Notes:**

- (1) Assumed total dredge volume taken to upland landfill through life of facility: 2,000,000 cy
- (2) Assumption for site development:
  - Pier/dock structure development/upgrade (~\$1.5M)
  - Addition of ~10,000 feet of new rail line & ~5 switches (~\$3.5M)
  - Creation of 12 to 15 acres of bermed stockpile areas holding up to 100,000 cy of sediment (~\$1M)
  - Mobilization of offloading equipment, off-road trucks, end loaders and other equipment (~\$0.5M)
  - Miscellaneous site improvements (utilities, water treatment, offices, etc.) (~\$1M)
- (3) Assumed another ~5 acres for support activities for total site need of 20 acres. Lease rate is yearly. Assumes lease paid by the Subtitle D disposal work since the Subtitle C is a fraction of the D volume.
- (4) Assuming 3,000 to 5,000 tons/day loaded out, 100 tons/gondola, and 10-day turnaround produces 300 to 500 rail cars needed each year. Assumes cars mobilized as part of Subtitle D disposal work.
- (5) Assumes 400,000 cy/season and 1.5 tons/cy weight conversion.
- (6) Assumes 15-acre stockpile receiving 37 inches/year of rain over the 6-month stockpile time. Assumes water treatment costs covered by the Subtitle D disposal work since the Subtitle C is a fraction of the D volume.
- (7) Only a limited amount of potential Subtitle C material is currently estimated (say 10% of total amount)

**DO NOT QUOTE OR CITE**

This document is currently under review by US EPA and its federal, state, and tribal partners, and is subject to change in whole or in part.

Table 26. In Situ Treatment Cost Buildups

**Assumption:** Material placed as pellet directly on the mudline using similar techniques as Enhanced EMNR placement.

Open water placement rate calculation:

Assume that the same placement method as EMNR which is:

1,200 tons/day or

21,600 sf/day

Confined water placement rate calculation:

Assume that the same placement method as EMNR which is:

400 tons/day or

7,200 sf/day

Unit weight of Sediment:

Pounds per acre of Sediment: 58,080

CY per acre of Sediment: 48

Tons/cy of Sediment: 0.61

Assumes carbon is Sediment placed at a AC concentration of 6 pounds per square yard. Costs from Upal Ghosh

Material costs per acre: \$145,200

Assumes material placed with same method for EMNR

Tons per acre of material: 29 6 pounds/SY carbon, with Sediment at 50% carbon by weight or 58,080 pounds/acre

Open water placement

Daily placement costs: \$26,000

Placement costs per sf: \$1.2

Confined area placement:

Daily placement costs: \$18,000

Placement costs per sf: \$2.5

Material and placement cost per acre - open water: \$198,000

Material and placement cost per acre - confined area: \$254,000

Material and placement cost per square foot - open water: \$4.50

Material and placement cost per square foot - confined area: \$5.80

**DO NOT QUOTE OR CITE**

This document is currently under review by US EPA and its federal, state, and tribal partners, and is subject to change in whole or in part.

Table 29A. Material Costs

Material	Unit	FOB Plant Price	Barge Load Fee	Transport Fee <sup>a</sup>	Contractor Markup <sup>b</sup>	Total Unit Cost	Notes
Base Cap	Ton	\$12	\$0.5	\$0.5	\$1.63	\$14.6	Knife River quote #7838 8/23/2010 from Gordy Jarman
Armor Material A	Ton	\$15	\$0.5	\$0.5	\$2.00	\$18.0	Knife River quote #7838 8/23/2010 from Gordy Jarman
Armor Material B	Ton	\$15	\$0.5	\$0.5	\$2.00	\$18.0	Knife River quote #7838 8/23/2010 from Gordy Jarman
Armor Material C	Ton	\$15	\$0.5	\$0.5	\$2.00	\$18.0	Knife River quote #7838 8/23/2010 from Gordy Jarman
Armor Material D	Ton	\$15	\$0.5	\$0.5	\$2.00	\$18.0	Knife River quote #7838 8/23/2010 from Gordy Jarman
ODOT 100	Ton	\$27	\$0.5	\$0.5	\$3.50	\$31.5	Knife River quote #7838 8/23/2010 from Gordy Jarman
ODOT 200	Ton	\$27	\$0.5	\$0.5	\$3.50	\$31.5	Knife River quote #7838 8/23/2010 from Gordy Jarman
Organoclay Mat	SF	\$2.2	NA	\$0.1	\$0.29	\$3.0	Increased the cost 15% to account for overlaps. Cetco quote 10/4/10 from James Wang

**Notes:**


<sup>a</sup> Assumes aggregate transported by barge and mat by truck to middle of harbor

<sup>b</sup> Contractor Markup: 12.5%

**DO NOT QUOTE OR CITE**

This document is currently under review by US EPA and its federal, state, and tribal partners, and is subject to change in whole or in part.

Table 29B. Vendor Quote



**KNIFE RIVER**  
 AN MDU RESOURCES COMPANY  
OR CCB #2101 WA #M0RSEB1169BR

**Quote #: 7838**

**Project Name:**  
*WILLAMETTE RIVER PROJECT*

**Delivery Address:**  
*T-4 WILLAMETTE RIVER*

**Customer:** *ANCHOR QEA*

**Attention:** *Micheal Crystal*  
**P: 206-287-9130**  
*mjcrystal@anchorqea.com*

Source	Product Name	FOB Plant Price	Transfer Delivery	Solo Delivery
Reichold	4"-3" SMALL COBBLES	\$15.00 Ton	\$22.00 Ton	
Reichold	2"-1" FINE GRAVEL	\$15.00 Ton	\$22.00 Ton	
Reichold	3/4"-1/4" FINE GRAVEL	\$15.00 Ton	\$22.00 Ton	
Reichold	3 1/2"-2 1/2" COURSE GRAVEL	\$15.00 Ton	\$22.00 Ton	
Reichold	GRAVELLY SAND	\$12.00 Ton	\$19.00 Ton	
Angell Quarry	CLASS 100 RIP RAP	\$20.00 Ton		\$27.00 Ton
Angell Quarry	CLASS 200 RIP RAP	\$20.00 Ton		\$27.00 Ton
Angell Quarry	CLASS 700 RIP RAP	\$25.00 Ton		\$32.00 Ton
Angell Quarry	CLASS 2000 RIP RAP	\$25.00 Ton		\$32.00 Ton

*The following terms will apply to material purchased at Knife River for this project:*

1. Prices include standard ODOT quality control and process control tests at the plant during production of the above quoted product(s). Acceptance of materials supplied by Knife River is at the plant at the time of production.
2. All gradations per ODOT specifications unless otherwise stated. Materials contain natural moisture only.
3. Credit terms net 15th of month following invoice.
4. Prices are for all materials and dump sites quoted inclusive.
5. Per ton pricing is based upon full load deliveries. Short loads are priced at truck time plus materials.
6. Knife River will attempt to secure adequate trucking with a minimum of 48 hours notice.
7. If applicable, dump site agreement must be signed before any export will be accepted.
8. Conversion rates & proctors are for information only & shall not be used to determine pay quantities.
9. No retainage of any material purchased.

**Remarks:**

1. PRICING IS FOR BUDGET PURPOSES.
2. KNIFE RIVER HAS A BARGE LOAD OUT FACILITY IF BARGING MATERIAL IS AN OPTION.
3. THE PRICE TO RENT KNIFE RIVER'S 6000 TON BARGE, KR-1, IS \$500 PER HOUR. THIS DOES NOT INCLUDE A TUGBOAT.
4. WE WILL LOAD THE ABOVE MATERIAL FROM THE REICHOLD SOURCE ONTO THE CUSTOMER'S BARGE FOR A FEE OF \$0.50 PER TON.
5. THE RATE AT WHICH WE LOAD KR-1 IS 1500 TONS PER HOUR. IF NEEDED, KNIFE RIVER WILL BACK THAT SPEED DOWN TO 1000 TONS PER HOUR TO ACCOMMODATE THE CUSTOMER'S BARGES LOADING CAPABILITY.

**Salesman:** Gordy Jarman  
 Mobile: (503) 572-7236  
 Office: (503) 944-3500  
 gordy.jarman@kniferiver.com

**Date of Origin:** 8/23/2010  
**Quote Expires:** 12/31/2010

**Printed:** 08/23/2010

**DO NOT QUOTE OR CITE**

This document is currently under review by US EPA and its federal, state, and tribal partners, and is subject to change in whole or in part.

Table 1. Harbor-wide, Long-term Monitoring and Maintenance Cost Backup

	Biota Tissue Monitoring	Six Surface Water Transect Composites	50 Surface Sediment Samples	Mob and Demob	Data Report, Data Management, and Monitoring Report
<b>Labor</b>					
Hours	768	1,020	364	160	1,360
Costs	\$91,740	\$121,560	\$43,360	\$18,960	\$166,675
<b>Sub-Contractors</b>					
Laboratory analysis	\$85,725	\$33,264	\$151,875		
Boat and core processing	\$18,000	\$53,180	\$18,900		
Data Validation	\$9,902	\$3,961	\$28,290		
<b>Reimursables</b>					
Vehicle rental	\$2,000	\$2,800	\$1,100	\$500	
Per diem	\$17,500	\$24,500	\$8,250	\$3,750	
<b>Equipment</b>	\$4,860	\$660	\$600	\$160	
<b>Subtotal</b>	\$229,727	\$239,925	\$252,375	\$23,370	\$166,675

Harbor Wide Task <sup>a</sup>	Cost	Cost with 40% Contingency
Tissue monitoring	\$420,000	\$588,000
Surface water	\$430,000	\$602,000
Sediment	\$442,000	\$619,000

**Note:**

<sup>a</sup> Each task will be conducted separately; include mob and demob plus data management and reporting.

Table 2. MNR/EMNR Long-term Monitoring and Maintenance Cost Backup

	<b>40 Power Grab Samples</b>	<b>Mob and Demob</b>	<b>Data Report, Data Management, and Monitoring Report</b>	<b>Total</b>
<b>Labor</b>				
Hours	308	160	1,220	
Costs	\$37,880	\$18,960	\$149,350	
<b>Sub-Contractors</b>				
Laboratory analysis	\$78,840			
Boat and core processing	\$18,620			
Data Validation	\$10,212			
<b>Reimbursables</b>				
Vehicle rental	\$900	\$400		
Per diem	\$8,250	\$3,000		
<b>Equipment</b>	\$520	\$160		
<b>Subtotal</b>	\$155,222	\$22,520	\$149,350	\$327,000
<b>Contingency (40%)</b>				\$131,000
<b>Total</b>				\$458,000
<b>Cost per Acre<sup>a</sup></b>				\$4,600

**Note:**

<sup>a</sup> Cost normalized for a 10-acre area. As noted in the text, only 10 percent of that area would be monitored to serve as a surrogate for the remaining areas.



Table 3. In Situ Treatment Long-term Monitoring and Maintenance Cost Backup

	40 1-foot Cores and 40 Porewater Samples	Mob and Demob	Data Report, Data Management, and Monitoring Report	Bathymetry	Total
<b>Labor</b>					
Hours	946	460	1,304	0	
Costs	\$112,660	\$18,960	\$159,045	\$0	
<b>Sub-Contractors</b>					
Laboratory analysis	\$363,600				
Boat and core processing	\$24,290				
Data Validation	\$43,286				
Bathymetry				\$40,000	
<b>Reimursables</b>					
Vehicle rental	\$2,600	\$400			
Per diem	\$19,500	\$3,000			
<b>Equipment</b>		\$1,925	\$160		
<b>Subtotal</b>	\$565,936	\$24,285	\$159,205	\$40,000	\$789,000
<b>Contingency (40%)</b>					\$316,000
<b>Total</b>					\$1,105,000
<b>Cost per Acre<sup>a</sup></b>					\$111,000

**Note:**

<sup>a</sup> Costs normalized for a 10-acre area.

Table 4. Engineered Cap Long-term Monitoring and Maintenance Cost Backup

	40 4-foot Cores, 160 Samples	Mob and Demob	Data Report, Data Management, and Monitoring Report	Bathymetry	Total
<b>Labor</b>					
Hours	586	160	1,352	0	
Costs	\$70,060	\$18,960	\$164,585	\$0	
<b>Sub-Contractors</b>					
Laboratory analysis	\$315,360				
Boat and core processing	\$31,460				
Data Validation	\$40,848				
Bathymetry				\$40,000	
<b>Reimursables</b>					
Vehicle rental	\$1,800	\$400			
Per diem	\$13,500	\$3,000			
<b>Equipment</b>	\$660				
<b>Subtotal</b>	\$473,688	\$22,360	\$164,585	\$40,000	\$701,000
<b>Contingency (40%)</b>					\$280,000
<b>Total</b>					\$981,000
<b>Cost per Acre<sup>a</sup></b>					\$98,000

**Note:**

<sup>a</sup> Costs normalized for a 10-acre area.

## **Attachment A**

# Memorandum

*To: Kristine Koch, Project Manager – U.S. Environmental Protection Agency (EPA) Region 10*

*From: Scott Coffey and Gary Hazen, CDM Federal Programs Corporation*

*Date: August 13, 2015*

*Subject: Methodology and Organization of Detailed Analysis Cost Estimates, Draft Feasibility Study, Portland Harbor Superfund Site*

## Introduction

CDM Federal Programs Corporation (CDM Smith) has been tasked to develop detailed analysis cost estimates for five alternatives (Alternatives B, D, E, F, and G) as part of the draft Feasibility Study (FS) for the Portland Harbor Superfund Site (herein referred to as “draft FS cost estimates”). The draft FS cost estimates are based on the scope of the alternatives as presented in the draft FS as of July 29, 2015.

## Purpose and Intended Uses

The draft FS cost estimate is developed during the detailed analysis phase to compare alternatives and support remedy selection. The intended use of the draft FS cost estimate is to provide a measure of total resource costs overtime (i.e. “life cycle costs”) associated with any given alternative and facilitate relative comparisons between alternatives for FS evaluation purposes.

## Generalized Scope of Remedial Alternatives

The draft FS includes six alternatives that were retained for detailed analysis, including the “No Further Action” alternative (Alternative A). Per EPA direction, Alternative A does not include activities that require cost estimating and thus is presented as a “zero” cost without any additional backup information.

All alternatives developed for the draft FS (other than Alternative A) include the following scope elements to address contaminated sediment and riverbank soils; the alternatives primarily differ with respect to quantities and related durations of work. The primary scope elements are as follows:

- Technology assignments
  - capping (several types depending on location and conditions)
  - dredging/excavation and related transportation/disposal
  - enhanced monitored natural recovery (EMNR)

- Monitored natural recovery (MNR)
- Institutional controls
- Monitoring and maintenance of remedy components (technology assignments as well as ICs) and five year site reviews

Other secondary elements of this scope include but are not limited to erosion/sedimentation best management practices and mitigation.

Transportation and disposal of dredged/excavated materials is a significant consideration that affects the overall costs of each alternative. The draft Fs presents two disposed material management (DMM) scenarios that may be implemented depending on the alternative. They include DMM Scenario 1 (confined disposal facility (CDF) and off-site disposal) and DMM Scenario 2 (off-site disposal). For purposes of presenting the alternatives for detailed analysis in the draft FS, DMM Scenario 2 was selected. Cost differences that could result in potential savings by implementing DMM Scenario 1 are discussed later in this memorandum.

The primary variable scope item between alternatives for off-site disposal is the type of facility used for off-site disposal of dredged/excavated contaminated sediments and riverbank soils and whether ex situ treatment is required prior to disposal. There are a number of complicating factors that can affect this decision such as presence of listed or characteristic RCRA hazardous waste, state hazardous waste (such as DDx), and designation of ex situ treatment PTW (i.e. NRC/NAPL PTW). In addition the off-site facilities (especially Subtitle D facilities when contemplating the acceptance of contaminated media) have the right to accept or reject the wastes proposed for disposal based on acceptance criteria.

The following assumptions were made for purposes of the detailed analysis cost estimates with respect to management, disposal, and ex situ treatment (if needed) at off-site facilities:

- All NRC/NAPL PTW will be disposed of at the representative Subtitle C/TSCA facility.
- Ex situ treatment of all NRC/NAPL PTW will be performed at the Subtitle C/TSCA facility before disposal because the representative Subtitle C/TSCA facility has treatment capabilities at the facility.
- Contaminated materials designated for the Subtitle C/TSCA facility need to be sufficiently managed through pre-treatment (dewatering and/or amendment with diatomaceous earth) to pass the paint filter test.
- All other contaminated sediment and riverbank soils designated for off-site disposal (including remaining PTW) will be disposed of at the representative Subtitle D facility.
- No treatment will be performed for contaminated sediment and riverbank soils designated for the Subtitle D facility as they are assumed to have waste classifications and contaminant concentrations when generated that are acceptable to the facility.
- Contaminated materials designated for the Subtitle D facility need to be sufficiently managed through pre-treatment (dewatering) to minimize free liquids.

Several modes of transport (truck, rail, and barge) are available for disposal of contaminated sediments and riverbank soils. After discussions with the representative Subtitle C/TSCA disposal facility (Chemical Waste Management of the Northwest) and the representative Subtitle D facility (Roosevelt Regional), the following assumptions were made for purposes of the detailed analysis cost estimates with respect to transport methods for disposal at off-site facilities:

- Transport of contaminated sediment/riverbank soils to the Subtitle C/TSCA facility is assumed to be by truck for all alternatives. The representative facility's opinion is that truck transport is equally cost-effective to rail transport due to the short distances and that barge transport, while possibly cost-effective, would also require transload at a port before truck transport the final distance to the facilities.
- Transport of contaminated sediment/riverbank soils for off-site disposal at the Subtitle D facility is assumed to be by rail for all alternatives. The representative facility's opinion is that for their facility rail transport may be equal or more cost effective than trucking so their provided unit costs include rail transport.
- Barge transport was only assumed for taking contaminated sediments and riverbank soils to the onsite transload facility (all alternatives).

With the exception of Alternative A, the remaining alternatives include the work activities listed as follows.

***Major Work Activities Costed for Alternatives B, D, E, F, and G:***

1. Implementation of institutional controls
2. Mobilization/demobilization
3. Development of a transload facility for facilitating off-site disposal of contaminated sediments and riverbank soils
4. Debris removal and disposal from dredge/excavation areas
5. Obstruction (i.e. structure and utility) removal and relocation from dredge/excavation areas
6. Dredging of contaminated sediments (both open water and confined dredging)
7. Excavation of riverbank materials from shore
8. Offloading of sediments to the transload facility (Alternatives B, D, E, F, and G)
9. Management of dredged/excavated sediments and riverbank soils at the transload facility, including dewatering
10. Transportation and disposal of contaminated sediments/riverbank soils at off-site facilities, as appropriate
11. Placement of sand, beach mix, armor, granular activated carbon (GAC), organoclay mats, and geofabric for technology assignments including capping, reactive residual layers, EMNR, and in situ treatment (such as broadcast GAC).

12. Mitigation of nearshore areas impacted by activities such as capping and dredging
13. MNR
14. Site-wide monitoring, cap area monitoring, and reactive layer monitoring
15. Long-term maintenance for capping, EMNR, and in-situ treatment
16. Five-year site reviews

## General Methodology and Relevant Cost Guidance

Cost estimates are developed according to *A Guide to Developing and Documenting Cost Estimates during the Feasibility Study* (EPA 2000). Flexibility is incorporated into each alternative for the location of remedial facilities, the selection of cleanup levels, and the period in which remedial action will be completed. Assumptions of the project scope and duration are defined for each alternative to provide cost estimates for the various remedial alternatives.

Types of costs that are assessed for each alternative include the following:

- Capital costs
- Annual O&M costs
- Periodic costs
- Present value of capital, annual O&M, and periodic costs

The levels of detail employed in making these estimates are conceptual but are considered appropriate for making choices between alternatives. The information provided in the cost estimate is based on the best available information regarding the anticipated scope of the remedial alternatives.

The costs are evaluated with respect to the following categories:

- Capital costs are expenditures that are required to construct a remedial action. They are exclusive of costs required to operate or maintain the action throughout its lifetime. Capital costs consist primarily of expenditures initially incurred to build or install the remedial action. Capital costs include all labor, equipment, and material costs (including contractor markups, such as overhead and profit) associated with activities, such as mobilization/demobilization, site work, dredging of sediments, installation of caps, and disposal facilities. Capital costs also include expenditures for professional/technical services that are necessary to support construction of the remedial action. The construction activities occurring as capital costs include major work activities 1 through 12.
- Annual O&M costs are post-construction costs necessary to ensure or verify the continued effectiveness of a remedial action. These costs are estimated mostly on an annual basis. Annual O&M costs include all labor, equipment, and material costs (including contractor markups, such as overhead and profit) associated with O&M activities. Annual O&M costs also include expenditures for professional/technical services necessary to support O&M activities. No work activities are included in these estimates that would be classified as annual O&M costs.

- Periodic costs are costs that occur only once every few years (e.g., 5-year reviews, monitoring, and maintenance) or expenditures that occur only once during the entire O&M period or remedial time frame (e.g., site closeout and remedy failure/replacement). These costs may be either capital or O&M costs, but because of their periodic nature, it is more practical to consider them separately from other capital or O&M costs in the estimating process. The post-construction activity occurring on a periodic basis that is typical of capital costs is the pre-construction baseline MNR event for major work activity 14. The post-construction activities occurring on a periodic basis that are typical of O&M costs include major work activities 13 through 16.
- The present value of each alternative provides the basis for the cost comparison. The present value cost represents the amount of money that, if invested in the initial year of the remedial action at a given rate, would provide the funds required to make future payments to cover all costs associated with the remedial action over its planned life. Future O&M and periodic costs are included and reduced by the appropriate present value real discount rate (7%) as outlined in *A Guide to Developing and Documenting Cost Estimates during the Feasibility Study* (EPA 540-R-00-002, July 2000). Inflation and depreciation were not considered in preparing the present value costs.

## Development Approach for Information Provided in Cost Worksheets

Unit quantities (lengths, areas and volumes) used to cost activities such as capping, dredging, in-situ treatment, EMNR, MNR, transport, and disposal were developed for each alternative primarily using the results of the technology assignment modeling performed using the software called "R". Additional calculations were developed by CDM Smith to supplement the quantities provided by the model. Output quantities from the technology assignment model and supplemental calculations are provided in estimate backup. In addition to the model quantities and supplemental calculations, additional quantities such as obstruction removal and relocation and installation of silt curtains and sheet piles were estimated from the Draft FS technology assignment figures for each alternative. Information provided by Anchor QEA, vendors, literature from sites of similar scope, as well as engineering judgment was used to develop quantity assumptions and other design components not estimated from the technology assignment model or Draft FS figures.

Unit costs were mainly derived from costs developed by Anchor QEA in 2010. These unit costs were originally obtained in 2010 but were escalated to the base year of these estimates (2015) using the Civil Works Construction Cost Index System (CWCCIS), Engineer Manual (EM) 1110-2-1304, Amendment #6 revised as of 31 March 2015.

In those instances where Anchor QEA's unit costs were not sufficiently documented or developed and are used for major work activities, supplemental unit costs were obtained. Costs that were derived from sources outside of Anchor QEA's unit costs include the following:

- Vendor quotes were obtained for transportation and disposal of waste at off-site disposal facilities, reactive carbon material costs, and geotextile material and placement costs.
- Unit costs for professional labor rates included in the labor rate backup were determined using FLCdatacenter.com tailored to the Portland, Oregon area. These labor rates were used in



developing costs for institutional controls, evaluating and updating institutional controls, and five-year site reviews.

- The mitigation unit cost was calculated from the average cost of two Lower Duwamish Waterway projects presented and referenced in Table 6.1-1 by Anchor QEA (2010).
- Mobilization/demobilization costs are applied as a percentage of the capital cost for each alternative. This percentage was based on an evaluation of the mobilization/demobilization costs presented in the detailed cost estimates of the Lower Duwamish Waterway Final Feasibility Study (EPA 2012). Lower Duwamish mobilization/demobilization costs accounted for approximately 1.5%-1.6% of total capital costs for each alternative based on the scope of the work. The scope and duration of the remedial activities assumed for each of the Lower Duwamish Waterway FS alternatives was taken into consideration when determining the cost assumption for mobilization/demobilization presented in the Draft FS. The derivation of the mobilization/demobilization assumption is presented in the summary of cost buildup (CALC-01).

Specific modifications from the general approach and shown in the cost worksheets include the following:

- Unit cost buildups provided by Anchor QEA (including quotes) indicate they include prime contractor overhead and profit; thus no additional overhead and profit was added to these items.
- Disposal and treatment costs obtained by EPA from the disposal facilities presumably include the facility's overhead and profit. However the prime contractor implementing the work would likely need to have some type of overhead costs for administering and tracking disposal off-site. Thus a handling fee of 5 percent was included in the prime contractor overhead but no additional profit was added on that activity.

## **Development Approach for Information Provided in Cost Summary Tables**

The cost summary tables are organized by the three major cost categories: capital costs, annual O&M costs, and periodic costs. Costs are totaled for each major work activity. Contingency and professional/technical services are applied within the cost summary tables after subtotaling the costs for major work activities. Percentages used for contingency and professional/technical services costs are based on the recommended ranges presented in Section 5.0 of *A Guide to Developing and Documenting Cost Estimates During the Feasibility Study* (EPA 2000), unless otherwise noted within the cost summary tables.

Specific modifications from the general approach and shown in the cost summary tables include the following:

- As described in Section 5.4 of *A Guide to Developing and Documenting Cost Estimates During the Feasibility Study*, engineering judgment may be used to adjust rule-of-thumb percentages presented in Exhibit 5-6 for scope contingency with a lower contingency indicating that project scope will undergo minimal change during design. Due to the high overall costs for major work activities and a detailed level of conceptual design performed as part of the

technology assignment modeling, the scope contingency percentages were modified to the low end of the recommended range presented in the guidance, to better reflect the detailed evaluation and concepts developed for these items.

- As described in Section 5.5 of *A Guide to Developing and Documenting Cost Estimates During the Feasibility Study*, engineering judgment may be used to adjust rule-of-thumb percentages presented in Exhibit 5-8 for project management, remedial design, and construction management as well as the recommended range presented for technical support. Due to the high overall costs for major work activities, the professional/technical percentages were modified to lower than the recommended range presented in the guidance, to better reflect realistic costs for professional/technical services costs for these items.
- As described in Section 5.6 of *A Guide to Developing and Documenting Cost Estimates During the Feasibility Study*, contingency is generally not applied to institutional control cost elements. However, due to the complexity of the site and the numerous property owners involved at the site, a 10% contingency (10% Scope, 0% Bid) was applied to account for uncertainties relating to application of institutional controls.
- As described in Section 5.5 of *A Guide to Developing and Documenting Cost Estimates During the Feasibility Study*, bid contingency is typically applied to remedial action construction or O&M activities. Since costs for 5-Year Site Reviews fall outside that definition, bid contingency was not applied for 5-Year Site Review Periodic Costs and only 10% scope contingency was applied.

## Development Approach for Information Provided in Present Value Tables

The present value of each alternative provides the basis for the cost comparison. The present value cost represents the amount of money that, if invested in the initial year of the remedial action at a given rate, would provide the funds required to make future payments to cover all costs associated with the remedial action over its planned life. Future O&M and periodic costs are included and reduced by the appropriate present value discount rate as outlined in *A Guide to Developing and Documenting Cost Estimates during the Feasibility Study* (EPA 2000a). Per the guidance, the present value analysis was performed on remedial alternatives using a 7 percent discount (interest) rate over the period of evaluation for each alternative. Inflation and depreciation were not considered in preparing the present value costs.

Specific modifications from the general approach and shown in the cost summary tables include the following:

- As discussed in *A Guide to Developing and Documenting Cost Estimates during the Feasibility Study* (EPA 2000), the real discount (interest) rate used for present value analysis in the FS depends on whether the Site is classified as a federal facility site. Federal facility sites are former or current installations operated or controlled by a federal government agency and identified by EPA's Federal Facilities Restoration and Reuse Office (FFRRO). The areas within the Site are not a federal facility identified within FFRRO's site inventory. In addition, the guidance specifically mentions that although a federal-lead site cleaned up by EPA using the Superfund trust fund (i.e., fund-lead sites) may be an analogous situation to a federal facility site being cleaned up using Superfund authority, there is always a chance that a potentially responsible party (PRP) could remediate the Site. Thus, per guidance a real discount rate of 7

percent should be used in calculating present value costs for all non-federal facility sites. A 7 percent real discount rate was used to develop present value costs for each retained alternative over the period of evaluation for each alternative since there is PRP involvement and the site or areas within the site are not identified as federal facilities in the FFRRO site inventory.

- As described in Section 4.2 of *A Guide to Developing and Documenting Cost Estimates During the Feasibility Study* (EPA 2000), most FS cost analyses assume that initial construction and startup will occur in year zero, but this assumption can be modified if it is known that capital construction costs will be expended beyond one year. Due to the vast size of the cleanup, capital construction costs for each alternative were split out evenly over assumed construction durations that are longer than the minimum calculated based solely on productivities and work windows. The assumed construction durations for the alternatives (starting at Year 0) are: 4 Years (Alternative B), 5 Years (Alternative D), 7 Years (Alternative E), 12 Years (Alternative F), and 18 Years (Alternative G).
- The project duration for each alternative is longer than the period of evaluation for present value analysis (Years 0 through 30 as selected by EPA). The guidance indicates in those situations that site-specific justification for the selected period of evaluation should be provided. It is likely that all remedial alternatives would require an indefinite duration of O&M (evaluated as periodic costs within these estimates). However, evaluation of long durations of O&M is cumbersome and is generally not necessary for comparative evaluation between alternatives because of the effects of cost discounting in later years under present value analysis. The period of analysis for the FS is assumed to be 30 years, because the increase of present value cost due to small periodic expenditures for maintenance and monitoring after 30 years is minimal relative to the accuracy range of the estimates. In addition, Anchor QEA also used a period of 30 years in their analysis. However for purposes of illustrating cost impacts beyond 30 years, EPA has elected to include costs to 100 years as part of sensitivity analyses in Attachment B.
- In addition, a “no-discounting” scenario is included for the present value analysis of each alternative as recommended by the guidance for long-term projects (e.g., project duration exceeding 30 years). A non-discounted constant dollar cash flow over time demonstrates the impact of a discount rate on the total present value cost and the relative amounts of future annual expenditures. Non-discounted constant dollar costs are presented for comparison purposes only and should not be used in place of present value costs in the Superfund remedy selection process.

## Development Approach for Sensitivity Analyses

During development of the draft FS cost, EPA provided questions and comments regarding the remedial alternative cost estimates. EPA requested a sensitivity analysis be performed to obtain a better understanding of the various cost drivers and the impact of these cost drivers on the total costs (both constant dollar (non-discounted) costs and present value dollar (discounted) costs).

Based on the comments/questions posed by EPA, CDM Smith performed the cost sensitivity analyses provided as Attachment B of this draft FS cost estimate.

## **Development Approach for DMM Scenario 1 (Confined Disposal Facility [CDF] and Off-Site Disposal) and DMM Scenario 2 (Off-Site Disposal) Comparison**

As previously indicated, as part of the general scope of draft FS cost estimates, DMM Scenario 2 (off-site disposal) was assumed for Alternatives B, D, E, F and G. However, DMM Scenario 1 (CDF and off-site disposal) may be viable and represent a potential cost savings for each eligible alternative (Alternatives E, F, and G) if it were to be implemented.

Costs were developed for each eligible alternative to reflect the assumptions of the DMM Scenario 1 which includes construction of a CDF and placement of a portion of the volume of dredged sediments into the CDF and off-site disposal of the remaining volume of dredged or excavated sediment and riverbank soils. Comparisons of costs for each alternative between DMM Scenario 1 and Scenario 2 provide an indication of the differences that represent potential cost savings by implementing DMM Scenario 1.

Attachment C of this draft FS cost estimate includes a comparison of total costs (both constant dollar [non-discounted] costs and present value dollar [discounted] costs) of DMM Scenario 1 (CDF and off-site disposal) and DMM Scenario 2 (off-site disposal).

## **Purpose and Accuracy of FS Detailed Analysis Cost Estimates**

Cost estimates are developed during the FS primarily for the purpose of comparing remedial alternatives during the remedy selection process, not for establishing project budgets or negotiating Superfund enforcement settlements. At the FS stage of the project, the “design” for the remedial action as represented by the remedial alternatives is still conceptual, not detailed, and the cost estimates are considered to be “order-of-magnitude”. The information provided in the cost estimate is based on the best available information regarding the anticipated scope of the remedial alternatives. As described in *A Guide to Developing and Documenting Cost Estimates During the Feasibility Study* (EPA 2000), the detailed analysis cost estimate is expected to have an accuracy between -30% to +50% of actual cost, based on the scope presented in the Draft FS.

## **FS Detailed Analysis Cost Estimate Organization**

The detailed analysis cost estimates are organized into the following sections:

- Detailed Analysis Cost Estimates
- Attachment A – Methodology and Organization of Detailed Analysis Cost Estimates, Draft Feasibility Study, Portland Harbor Superfund Site

This is the memorandum you are currently reading that summarizes the approach to developing the detailed analysis cost estimates within the draft FS for the Portland Harbor Superfund Site.

- Attachment B – Sensitivity Analyses
- Attachment C - Comparison of Costs for DMM Scenario 1 (CDF and Off-Site Disposal) and DMM Scenario 2 (Off-site Disposal)

## **Attachment B**

# Sensitivity Analysis

## Draft Feasibility Study

### Portland Harbor Superfund Site

## Introduction

CDM Federal Programs Corporation (CDM Smith) has been tasked to complete detailed analysis cost estimates for the Portland Harbor Superfund Site Draft Feasibility Study (FS), herein referred to as the draft FS cost estimates. During development of the draft FS cost estimates, EPA requested sensitivity analyses be performed to obtain a better understanding of the impacts of various cost drivers on the total costs (both constant dollar (non-discounted) costs and present value dollar (discounted) costs).

## General Methodology and Relevant Cost Guidance

Cost estimates are developed according to *A Guide to Developing and Documenting Cost Estimates during the Feasibility Study* (EPA 540-R-00-002, July 2000). Section 5.8 of this guidance provides information specific to performing sensitivity analyses. According to this guidance, Sensitivity analysis is a type of uncertainty analysis that measures the project impact of changing one or more input values. In the development of a remedial alternative cost estimate, a sensitivity analysis should be considered for those factors that have a relatively high degree of uncertainty and that, with only a small change in their value, could significantly affect the overall cost of the alternative.

Factors typically considered in a cost sensitivity analysis for a remedial alternative include:

- Nature and Extent of Contamination – Estimated volumes of contaminated media or material and degree of contamination (i.e., concentrations) are dependent on assumptions about site conditions.
- Remedy Failure / Effective Life of Technology - The potential failure of a remedy or components thereof would require substantial additional costs for replacement of the remedy or its components. Particularly relevant for technologies or processes that are unproven and lack sufficient performance history.
- Project Duration – The time required for a remedial action, or components thereof, to achieve remedial action objectives can be a major factor, particularly for those actions requiring many years of O&M.
- Discount Rate – Although a rate of 7% should normally be used to compare alternatives, a range of values both below and above 7% can be used to investigate uncertainty concerning future economic conditions.

A sensitivity analysis might vary the values for these factors (e.g., low, medium, high), while keeping the values for other factors the same, and noting the impact on the total estimated cost. The results of a sensitivity analysis should be reported in terms of total present value for each scenario. The baseline, or original estimate, should be included for comparison.

# Sensitivity Analyses Selected for the Draft FS

Based on input from EPA, CDM Smith performed sensitivity analyses for the following cost estimate evaluations and comparisons:

## 1) Period of Analysis Assumptions (30 years versus 100 years)

Comparison of constant dollar (non-discounted) costs and present value (discounted) costs for Alternatives B, D, E, F, and G for two periods of analysis (30 years and 100 years). Under this evaluation, capital costs, periodic costs, and annual O&M costs were kept constant for both periods of analyses. The difference between the two scenarios is that periodic costs and annual costs ceased at Year 30 for the 30 year period of analysis and continued until year 100 for the 100 year period of analysis. These costs are presented with a tabular format in Exhibit 1. The accompanying graphs illustrate the how the constant dollar (non-discounted) costs and present value (discounted) costs increase from year 0 to year 100 for each of the alternatives.

## 2) Monitoring Frequency Assumptions (currently assumed monitoring frequency vs. 5-year frequency)

Comparison of constant dollar (non-discounted) costs and present value (discounted) costs for Alternatives B, D, E, F, and G for two separate O&M frequency scenarios. Frequency for site-wide monitoring and monitored natural recovery is currently assumed to occur every 2 years for the first 10 years, followed by every 4 years for the remaining years of the 30 year period of analysis. This current assumption was compared to a scenario where frequency for monitoring is assumed to occur every 5 years for the entire 30 year period of analysis. All capital costs and other costs not related to monitoring were kept constant for both scenarios. These costs are presented in Exhibit 2 and presented graphically for Alternatives B and G.

## 3) Subtitle C/TSCA Disposal Volume Assumptions (current Subtitle C/TSCA disposal volume vs. Subtitle C/TSCA disposal volume $\pm$ 15%)

Comparison of constant dollar (non-discounted) costs and present value (discounted) costs for Alternatives B, D, E, F, and G for three separate Subtitle C/TSCA disposal scenarios. In this comparison, the current volume assumption for Subtitle C/TSCA disposal was reduced by 15% in one scenario and increased by 15% in the other scenario. Under each scenario, the overall disposal volume was held constant, while the Subtitle C/TSCA volume was adjusted (i.e. when Subtitle C/TSCA volume was reduced by 15% of its total volume, the volume assumed for Subtitle D was increased by that corresponding volume and thus overall volume remained constant). All capital costs not related to the offsite disposal as well as periodic costs and annual costs were kept constant for all three scenarios. These costs are presented in Exhibit 3 and presented graphically for Alternatives B and G.

4) Construction Duration Assumptions (currently assumed construction duration versus construction duration  $\pm$  50%)

Comparison of constant dollar (non-discounted) costs and present value (discounted) costs for Alternatives B, D, E, F, and G for three separate construction duration scenarios. In this comparison, the current construction duration assumptions were reduced by 50% in one scenario and increased by 50% in the other scenario. Under each scenario the total capital costs for construction was held constant, while the application of the costs within the present value analysis was adjusted (i.e. the total capital cost was divided by the duration, and annually applied per year in the present value analysis). Periodic costs were kept constant for all three scenarios. These costs are presented in Exhibit 4 and presented graphically for Alternatives B, D, E, F, and G.

5) Overdredge Assumptions (currently assumed (average) overdredge factor assumption [1.75] vs. low/high overdredge factor [1.50/2.0])

Comparison of constant dollar (non-discounted) costs and present value (discounted) costs for Alternatives B, D, E, F, and G for three separate overdredge scenarios. Overdredge is currently accounted for by applying an overdredge factor of 1.75 to the calculated neat dredge volumes. In this comparison, overdredge factors of 1.50 [low] and 2.0 [high] are compared to the base assumption of 1.75. By increasing the overdredge factor, the overall dredging volumes as well as offsite disposal volumes (both Subtitle C/TSCA and Subtitle D) increase, while decreasing the overdredge factor will decrease those volumes. All capital costs not related to the overdredge factor as well as periodic costs and annual costs were kept constant for all three scenarios. These costs are presented in Exhibit 5 and presented graphically for Alternatives B and G.

## Conclusions

Based on the exhibits and the accompanying figures/tables, the following conclusions can be drawn for the scenarios evaluated as part of this sensitivity analysis:

1) Period of Analysis Assumptions (30 years versus 100 years)

As illustrated in figures accompanying Exhibit 1, the constant dollar costs for each alternative increase as the periods of analyses increase. However, the constant dollar expenditures after year 30 have minimal effects on the present value costs. Based on the analysis, the present value costs are generally not sensitive to changes to period of analysis beyond 30 years.

2) Monitoring Frequency Assumptions (currently assumed O&M Frequency vs. 5-year frequency)

As illustrated in Exhibit 2, reducing the frequency of O&M has a small to moderate impact on the total present value cost. Total present value cost of each alternative was reduced by between approximately 8 and 9% by reducing the O&M frequency to every five years.



3) Subtitle C/TSCA Disposal Volume Assumptions (current Subtitle C/TSCA disposal volume vs. Subtitle C disposal volume  $\pm$  15%)

As illustrated in Exhibit 3, reducing and increasing the volumes of Subtitle C by 15% has minimal effects on the total present value cost relative to the other sensitivity analysis scenarios. The total present value cost was increased by approximately 5% and 2% for Alternatives B and G, respectively, with a 15% increase in Subtitle C volume. Conversely, the total present value cost was reduced by approximately 5% and 2% for Alternatives B and G, respectively, with a 15% decrease in Subtitle C volume. Based on the analysis, there is minimal sensitivity in present value costs due to changes to these volumes. There is some additional minor sensitivity between alternatives (i.e. there is a greater magnitude in cost impacts for Alternative B than Alternative G) due to the increased volumes of overall dredging independent of the disposal assumptions.

4) Construction Duration Assumptions (currently assumed construction duration versus construction duration  $\pm$  50%)

As illustrated in Exhibit 4, reducing and increasing the construction duration assumptions has a relatively significant effect on the total present value cost compared to the other sensitivity analysis scenarios. Total present value cost was increased by a range of approximately 5 and 20% for Alternatives B and G, respectively, with a 50% increase in construction duration compared to the baseline estimate. The total present value cost was reduced by a range of approximately 5 and 17% for Alternatives B and G, respectively, with a 50% decrease in construction duration compared to the baseline. Shorting the construction durations has a slightly higher effect on sensitivity for all alternatives compared to lengthening the construction duration.

5) Overdredge Assumptions (current overdredge factor assumption [1.75] vs. low/high overdredge factor [1.50/2.0])

As illustrated in Exhibit 5, reducing and increasing the overdredge factor has a small to moderate impact on the total present value cost. Total present value cost was increased by approximately 7% by increasing the overdredge factor to 2.0 and reduced by 8% by decreasing the overdredge factor to 1.5.

Exhibit 1

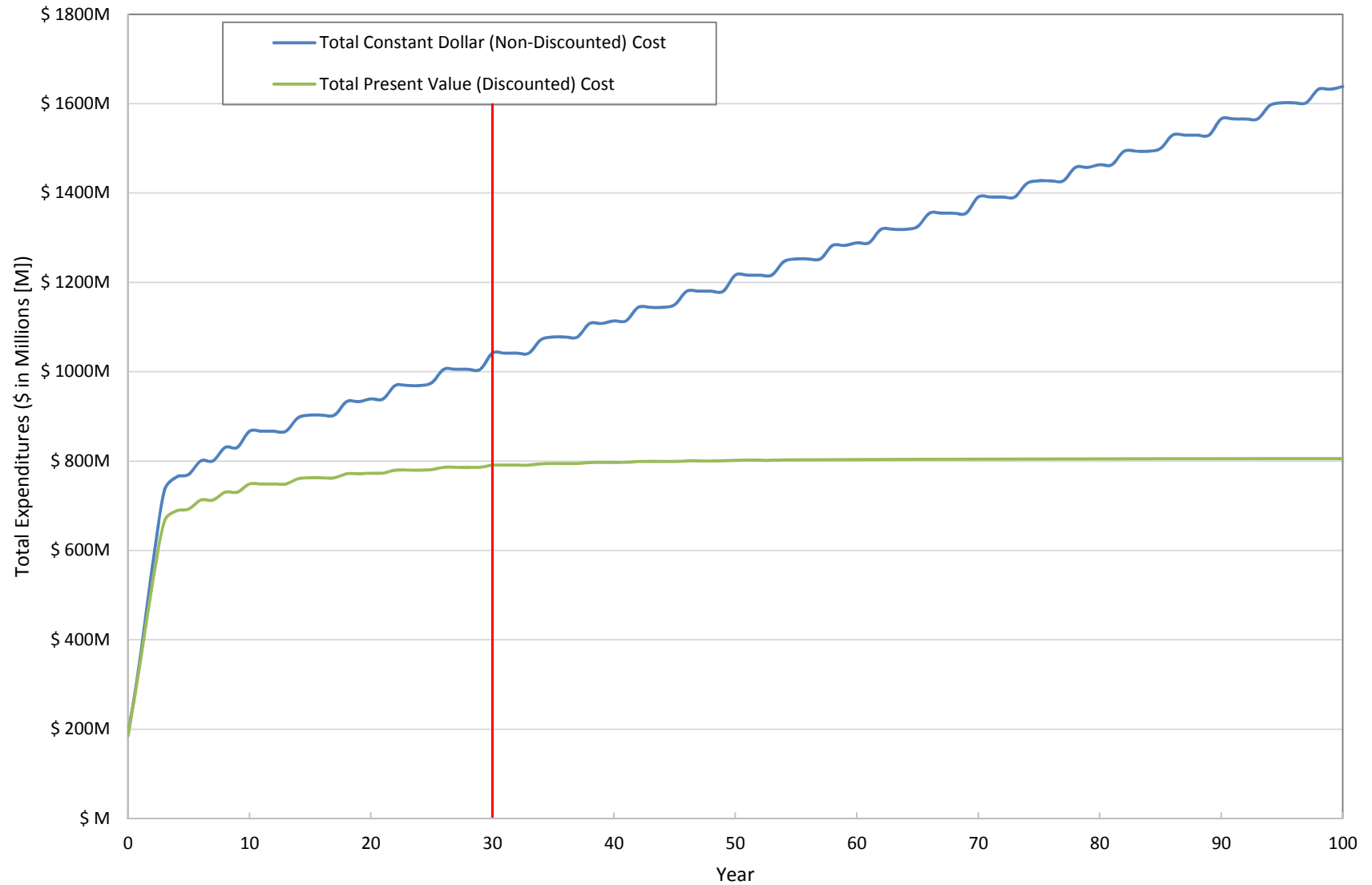
Comparison of Constant Dollar Costs and Present Value Costs

Alternatives B, D, E, F, and G as Presented in the Draft FS

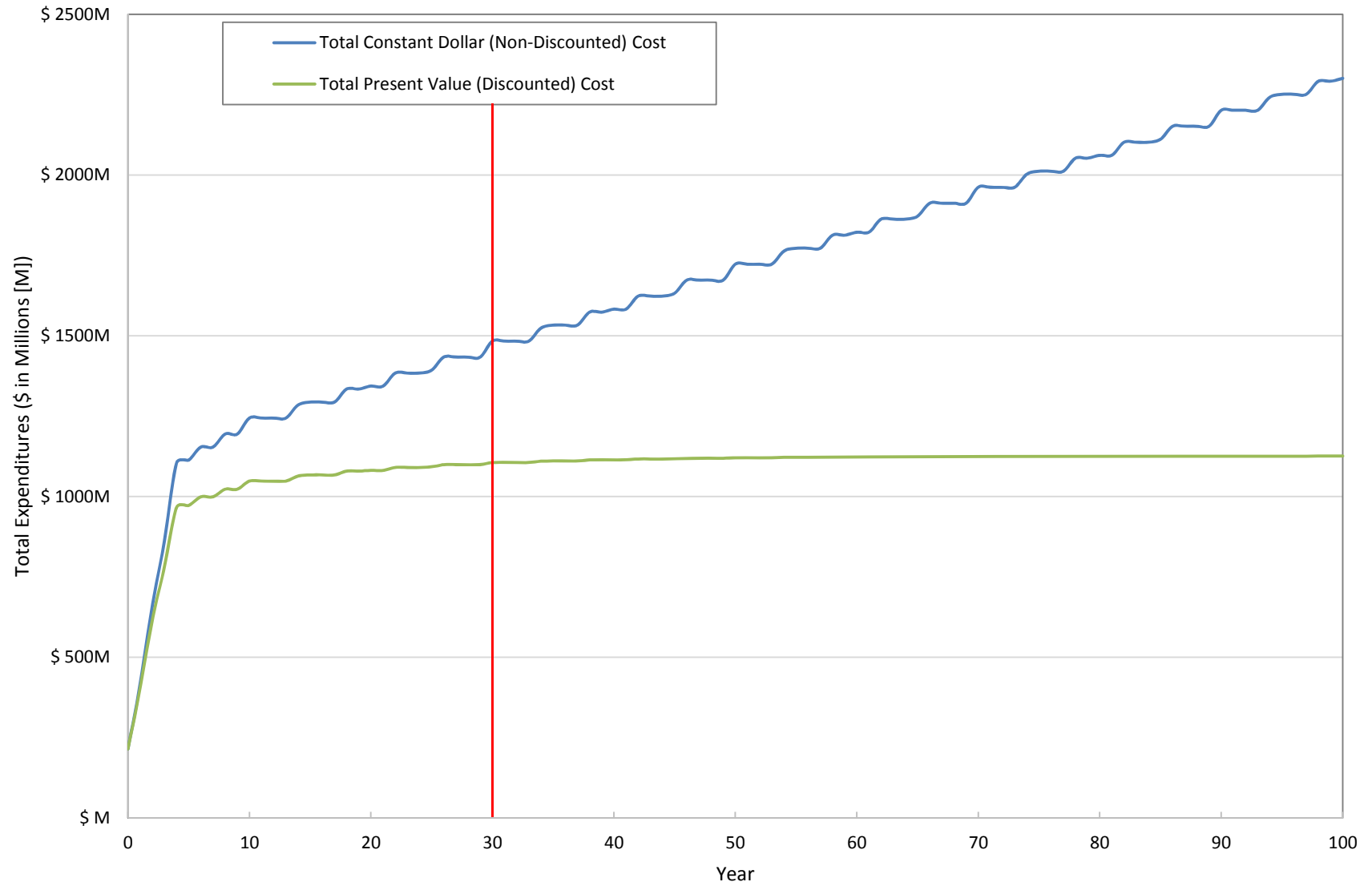
Two Periods of Analyses (30 Years and 100 Years)

Scenario	Alternative B Total Expenditures		Alternative D Total Expenditures		Alternative E Total Expenditures		Alternative F Total Expenditures		Alternative G Total Expenditures	
	Constant Dollar Cost	Present Value Cost	Constant Dollar Cost	Present Value Cost	Constant Dollar Cost	Present Value Cost	Constant Dollar Cost	Present Value Cost	Constant Dollar Cost	Present Value Cost
30-Year Period of Analysis (Base Estimate Scenario)	\$1,041,428,000	\$790,870,000	\$1,483,174,000	\$1,105,550,000	\$2,104,582,000	\$1,490,610,000	\$3,191,948,000	\$2,053,600,000	\$4,333,391,000	\$2,446,450,000
100-Year Period of Analysis	\$1,637,928,000	\$805,430,000	\$2,300,518,000	\$1,125,480,000	\$3,266,219,000	\$1,518,910,000	\$4,628,553,000	\$2,088,570,000	\$6,085,331,000	\$2,489,090,000

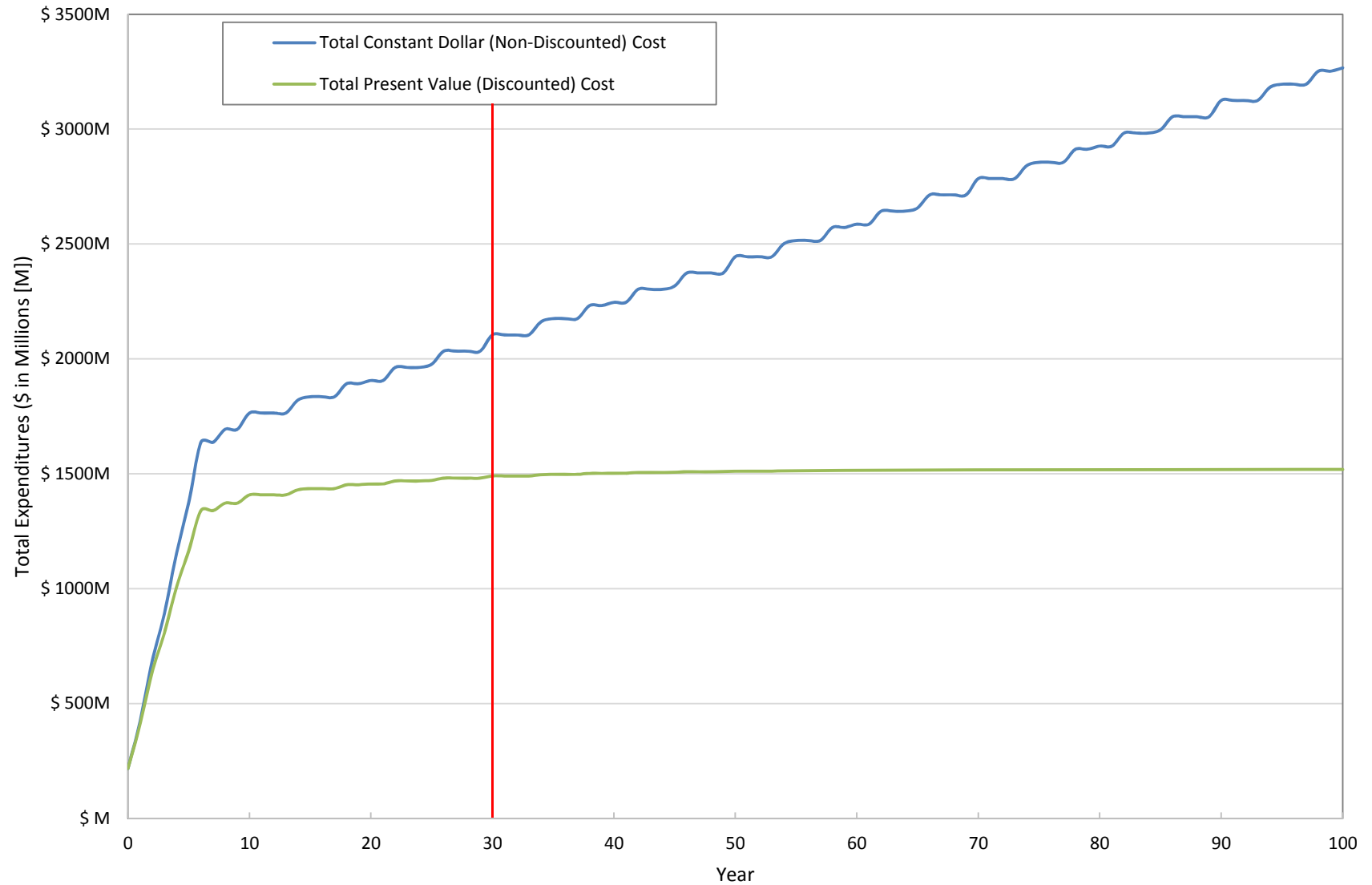
**Exhibit 1-B**  
**Total Constant Dollar Expenditures versus Total Present Value Expenditures**  
**Alternative B - 100 Year Period of Analysis**



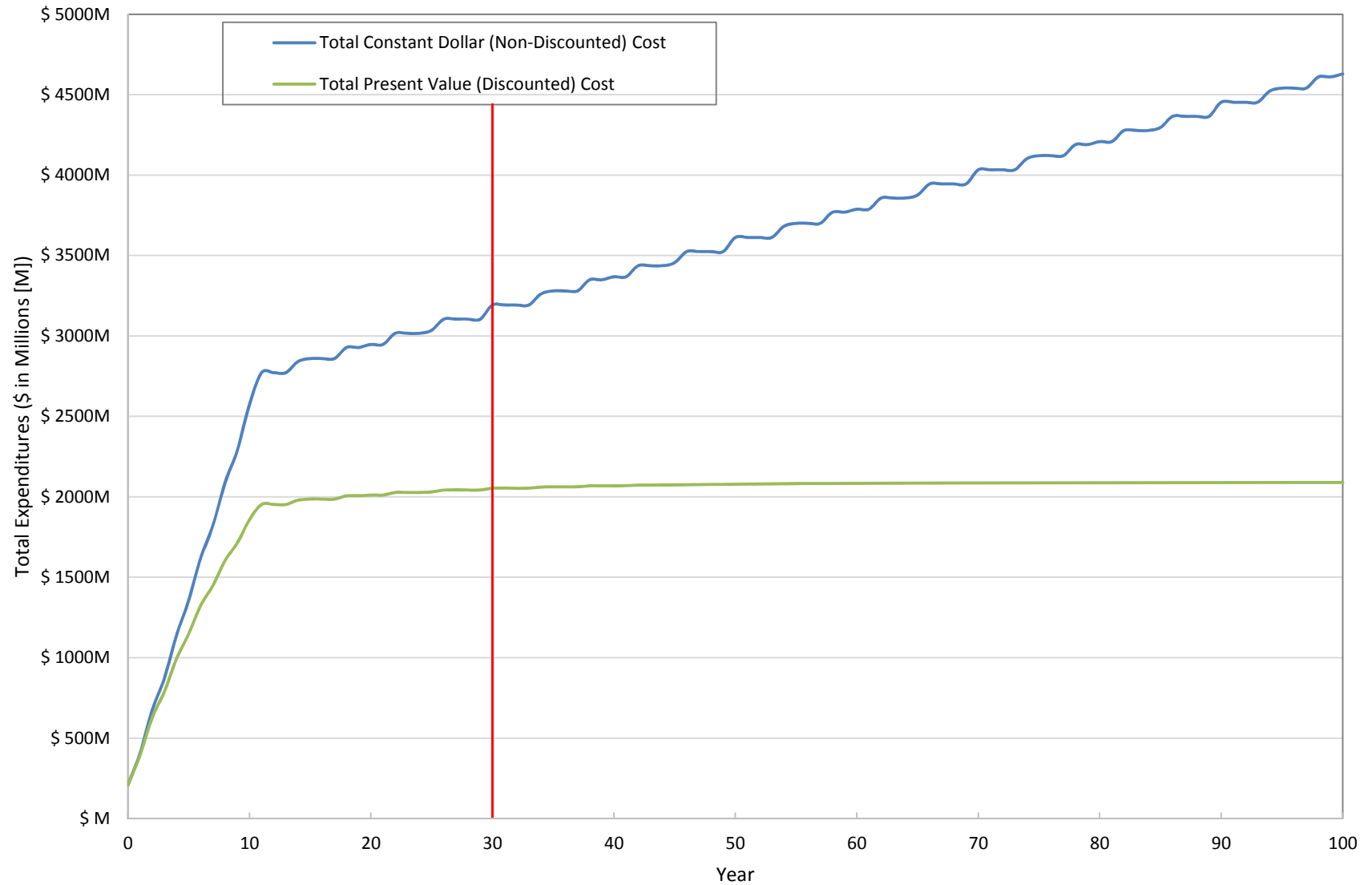
**Exhibit 1-D**  
**Total Constant Dollar Expenditures versus Total Present Value Expenditures**  
**Alternative D - 100 Year Period of Analysis**



**Exhibit 1-E**  
**Total Constant Dollar Expenditures versus Total Present Value Expenditures**  
**Alternative E - 100 Year Period of Analysis**



**Exhibit 1-F**  
**Total Constant Dollar Expenditures versus Total Present Value Expenditures**  
**Alternative F - 100 Year Period of Analysis**



**Exhibit 1-G**  
**Total Constant Dollar Expenditures versus Total Present Value Expenditures**  
**Alternative G - 100 Year Period of Analysis**

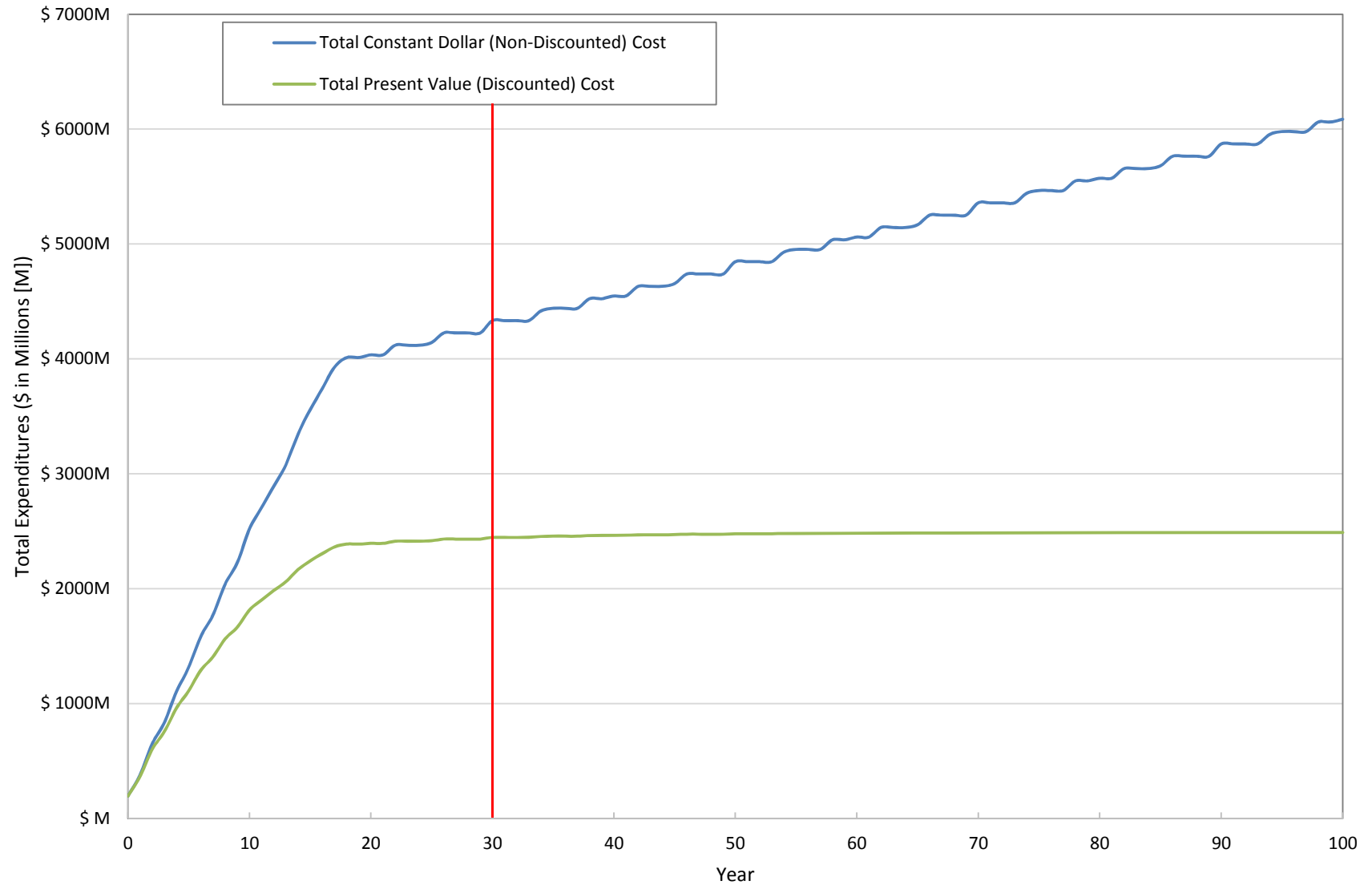


TABLE PV-A

## PRESENT VALUE ANALYSIS

Alternative A

Site: Portland Harbor Superfund Site  
 Location: Portland, Oregon  
 Phase: Draft Feasibility Study (-30% to +50%)  
 Base Year: 2015

Year <sup>1</sup>	Capital Costs (Institutional Controls) <sup>2</sup>	Capital Costs (Monitored Natural Recovery) <sup>2</sup>	Capital Costs (Technology Assignments) <sup>2</sup>	Periodic Costs (Long Term Monitoring and Monitored Natural Recovery)	Periodic Costs (Institutional Controls)	Periodic Costs (Five-Year Site Reviews)	Total Annual Expenditure <sup>3</sup>	Discount Factor (7.0%)	Present Value <sup>4</sup>
0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	1.0000	\$0
1	\$0	\$0	\$0	\$0	\$0	\$0	\$0	0.9346	\$0
2	\$0	\$0	\$0	\$0	\$0	\$0	\$0	0.8734	\$0
3	\$0	\$0	\$0	\$0	\$0	\$0	\$0	0.8163	\$0
4	\$0	\$0	\$0	\$0	\$0	\$0	\$0	0.7629	\$0
5	\$0	\$0	\$0	\$0	\$0	\$0	\$0	0.7130	\$0
6	\$0	\$0	\$0	\$0	\$0	\$0	\$0	0.6663	\$0
7	\$0	\$0	\$0	\$0	\$0	\$0	\$0	0.6227	\$0
8	\$0	\$0	\$0	\$0	\$0	\$0	\$0	0.5820	\$0
9	\$0	\$0	\$0	\$0	\$0	\$0	\$0	0.5439	\$0
10	\$0	\$0	\$0	\$0	\$0	\$0	\$0	0.5083	\$0
11	\$0	\$0	\$0	\$0	\$0	\$0	\$0	0.4751	\$0
12	\$0	\$0	\$0	\$0	\$0	\$0	\$0	0.4440	\$0
13	\$0	\$0	\$0	\$0	\$0	\$0	\$0	0.4150	\$0
14	\$0	\$0	\$0	\$0	\$0	\$0	\$0	0.3878	\$0
15	\$0	\$0	\$0	\$0	\$0	\$0	\$0	0.3624	\$0
16	\$0	\$0	\$0	\$0	\$0	\$0	\$0	0.3387	\$0
17	\$0	\$0	\$0	\$0	\$0	\$0	\$0	0.3166	\$0
18	\$0	\$0	\$0	\$0	\$0	\$0	\$0	0.2959	\$0
19	\$0	\$0	\$0	\$0	\$0	\$0	\$0	0.2765	\$0
20	\$0	\$0	\$0	\$0	\$0	\$0	\$0	0.2584	\$0
21	\$0	\$0	\$0	\$0	\$0	\$0	\$0	0.2415	\$0
22	\$0	\$0	\$0	\$0	\$0	\$0	\$0	0.2267	\$0
23	\$0	\$0	\$0	\$0	\$0	\$0	\$0	0.2109	\$0
24	\$0	\$0	\$0	\$0	\$0	\$0	\$0	0.1971	\$0
25	\$0	\$0	\$0	\$0	\$0	\$0	\$0	0.1842	\$0
26	\$0	\$0	\$0	\$0	\$0	\$0	\$0	0.1722	\$0
27	\$0	\$0	\$0	\$0	\$0	\$0	\$0	0.1609	\$0
28	\$0	\$0	\$0	\$0	\$0	\$0	\$0	0.1504	\$0
29	\$0	\$0	\$0	\$0	\$0	\$0	\$0	0.1406	\$0
30	\$0	\$0	\$0	\$0	\$0	\$0	\$0	0.1314	\$0
31	\$0	\$0	\$0	\$0	\$0	\$0	\$0	0.1228	\$0
32	\$0	\$0	\$0	\$0	\$0	\$0	\$0	0.1147	\$0
33	\$0	\$0	\$0	\$0	\$0	\$0	\$0	0.1072	\$0
34	\$0	\$0	\$0	\$0	\$0	\$0	\$0	0.1002	\$0
35	\$0	\$0	\$0	\$0	\$0	\$0	\$0	0.0937	\$0
36	\$0	\$0	\$0	\$0	\$0	\$0	\$0	0.0875	\$0
37	\$0	\$0	\$0	\$0	\$0	\$0	\$0	0.0818	\$0
38	\$0	\$0	\$0	\$0	\$0	\$0	\$0	0.0765	\$0
39	\$0	\$0	\$0	\$0	\$0	\$0	\$0	0.0715	\$0
40	\$0	\$0	\$0	\$0	\$0	\$0	\$0	0.0668	\$0
41	\$0	\$0	\$0	\$0	\$0	\$0	\$0	0.0624	\$0
42	\$0	\$0	\$0	\$0	\$0	\$0	\$0	0.0583	\$0
43	\$0	\$0	\$0	\$0	\$0	\$0	\$0	0.0545	\$0
44	\$0	\$0	\$0	\$0	\$0	\$0	\$0	0.0509	\$0
45	\$0	\$0	\$0	\$0	\$0	\$0	\$0	0.0476	\$0
46	\$0	\$0	\$0	\$0	\$0	\$0	\$0	0.0445	\$0
47	\$0	\$0	\$0	\$0	\$0	\$0	\$0	0.0416	\$0
48	\$0	\$0	\$0	\$0	\$0	\$0	\$0	0.0389	\$0
49	\$0	\$0	\$0	\$0	\$0	\$0	\$0	0.0363	\$0
50	\$0	\$0	\$0	\$0	\$0	\$0	\$0	0.0339	\$0
51	\$0	\$0	\$0	\$0	\$0	\$0	\$0	0.0317	\$0
52	\$0	\$0	\$0	\$0	\$0	\$0	\$0	0.0297	\$0
53	\$0	\$0	\$0	\$0	\$0	\$0	\$0	0.0277	\$0
54	\$0	\$0	\$0	\$0	\$0	\$0	\$0	0.0259	\$0
55	\$0	\$0	\$0	\$0	\$0	\$0	\$0	0.0242	\$0
56	\$0	\$0	\$0	\$0	\$0	\$0	\$0	0.0226	\$0
57	\$0	\$0	\$0	\$0	\$0	\$0	\$0	0.0211	\$0
58	\$0	\$0	\$0	\$0	\$0	\$0	\$0	0.0198	\$0
59	\$0	\$0	\$0	\$0	\$0	\$0	\$0	0.0185	\$0
60	\$0	\$0	\$0	\$0	\$0	\$0	\$0	0.0173	\$0
61	\$0	\$0	\$0	\$0	\$0	\$0	\$0	0.0161	\$0
62	\$0	\$0	\$0	\$0	\$0	\$0	\$0	0.0151	\$0
63	\$0	\$0	\$0	\$0	\$0	\$0	\$0	0.0141	\$0
64	\$0	\$0	\$0	\$0	\$0	\$0	\$0	0.0132	\$0
65	\$0	\$0	\$0	\$0	\$0	\$0	\$0	0.0123	\$0
66	\$0	\$0	\$0	\$0	\$0	\$0	\$0	0.0115	\$0
67	\$0	\$0	\$0	\$0	\$0	\$0	\$0	0.0107	\$0
68	\$0	\$0	\$0	\$0	\$0	\$0	\$0	0.0100	\$0
69	\$0	\$0	\$0	\$0	\$0	\$0	\$0	0.0094	\$0
70	\$0	\$0	\$0	\$0	\$0	\$0	\$0	0.0088	\$0
71	\$0	\$0	\$0	\$0	\$0	\$0	\$0	0.0082	\$0
72	\$0	\$0	\$0	\$0	\$0	\$0	\$0	0.0077	\$0
73	\$0	\$0	\$0	\$0	\$0	\$0	\$0	0.0072	\$0
74	\$0	\$0	\$0	\$0	\$0	\$0	\$0	0.0067	\$0
75	\$0	\$0	\$0	\$0	\$0	\$0	\$0	0.0063	\$0



TABLE PV-A									
PRESENT VALUE ANALYSIS									
Alternative A									
Site: Portland Harbor Superfund Site Location: Portland, Oregon Phase: Draft Feasibility Study (-30% to +50%) Base Year: 2015									
Year <sup>1</sup>	Capital Costs (Institutional Controls) <sup>2</sup>	Capital Costs (Monitored Natural Recovery) <sup>2</sup>	Capital Costs (Technology Assignments) <sup>2</sup>	Periodic Costs (Long Term Monitoring and Monitored Natural Recovery)	Periodic Costs (Institutional Controls)	Periodic Costs (Five-Year Site Reviews)	Total Annual Expenditure <sup>3</sup>	Discount Factor (7.0%)	Present Value <sup>4</sup>
76	\$0	\$0	\$0	\$0	\$0	\$0	\$0	0.0058	\$0
77	\$0	\$0	\$0	\$0	\$0	\$0	\$0	0.0055	\$0
78	\$0	\$0	\$0	\$0	\$0	\$0	\$0	0.0051	\$0
79	\$0	\$0	\$0	\$0	\$0	\$0	\$0	0.0048	\$0
80	\$0	\$0	\$0	\$0	\$0	\$0	\$0	0.0045	\$0
81	\$0	\$0	\$0	\$0	\$0	\$0	\$0	0.0042	\$0
82	\$0	\$0	\$0	\$0	\$0	\$0	\$0	0.0039	\$0
83	\$0	\$0	\$0	\$0	\$0	\$0	\$0	0.0036	\$0
84	\$0	\$0	\$0	\$0	\$0	\$0	\$0	0.0034	\$0
85	\$0	\$0	\$0	\$0	\$0	\$0	\$0	0.0032	\$0
86	\$0	\$0	\$0	\$0	\$0	\$0	\$0	0.0030	\$0
87	\$0	\$0	\$0	\$0	\$0	\$0	\$0	0.0028	\$0
88	\$0	\$0	\$0	\$0	\$0	\$0	\$0	0.0026	\$0
89	\$0	\$0	\$0	\$0	\$0	\$0	\$0	0.0024	\$0
90	\$0	\$0	\$0	\$0	\$0	\$0	\$0	0.0023	\$0
91	\$0	\$0	\$0	\$0	\$0	\$0	\$0	0.0021	\$0
92	\$0	\$0	\$0	\$0	\$0	\$0	\$0	0.0020	\$0
93	\$0	\$0	\$0	\$0	\$0	\$0	\$0	0.0019	\$0
94	\$0	\$0	\$0	\$0	\$0	\$0	\$0	0.0017	\$0
95	\$0	\$0	\$0	\$0	\$0	\$0	\$0	0.0016	\$0
96	\$0	\$0	\$0	\$0	\$0	\$0	\$0	0.0015	\$0
97	\$0	\$0	\$0	\$0	\$0	\$0	\$0	0.0014	\$0
98	\$0	\$0	\$0	\$0	\$0	\$0	\$0	0.0013	\$0
99	\$0	\$0	\$0	\$0	\$0	\$0	\$0	0.0012	\$0
100	\$0	\$0	\$0	\$0	\$0	\$0	\$0	0.0012	\$0
TOTALS:	\$0	\$0	\$0	\$0	\$0	\$0	\$0		\$0
TOTAL PRESENT VALUE OF ALTERNATIVE A <sup>5</sup>									\$0

**Notes:**

<sup>1</sup> The alternative is expected to require cost expenditures for perpetuity since contamination within the sediment bed and associated riverbank soils would remain in-place that do not allow for unrestricted use or unlimited exposure to human or ecological receptors. However the period of analysis was assumed to be 100 yrs beyond the construction in Year 0.

<sup>2</sup> Capital costs, for purposes of this analysis, are assumed to be distributed as indicated on Table CS-A.

<sup>3</sup> Total annual expenditure is the total cost per year with no discounting.

<sup>4</sup> Present value is the total cost per year including a 7.0% discount factor for that year. See Table PV-ADRFT for details.

<sup>5</sup> Total present value is rounded to the nearest \$10,000. Inflation and depreciation are excluded from the present value cost.

Costs presented for this alternative are expected to have an accuracy between -30% to +50% of actual costs, based on the scope presented. They are prepared solely to facilitate relative comparisons between alternatives for FS evaluation purposes.

TABLE PV-B

## PRESENT VALUE ANALYSIS

Alternative B

Site: Portland Harbor Superfund Site  
 Location: Portland, Oregon  
 Phase: Draft Feasibility Study (-30% to +50%)  
 Base Year: 2015

Year <sup>1</sup>	Capital Costs (Institutional Controls) <sup>2</sup>	Capital Costs (Monitored Natural Recovery) <sup>2</sup>	Capital Costs (Technology Assignments) <sup>2</sup>	Annual O&M Costs	Periodic Costs (Long Term Monitoring and Monitored Natural Recovery)	Periodic Costs (Long Term Operations and Maintenance and Institutional Controls)	Periodic Costs (Five-Year Site Reviews)	Total Annual Expenditure <sup>3</sup>	Discount Factor (7.0%)	Present Value <sup>4</sup>
0	\$464,750	\$13,195,000	\$172,213,000	\$0	\$0	\$0	\$0	\$185,872,750	1.0000	\$185,872,750
1	\$464,750	\$0	\$172,213,000	\$0	\$0	\$0	\$0	\$172,677,750	0.9346	\$161,384,625
2	\$464,750	\$0	\$172,213,000	\$0	\$30,166,000	\$0	\$0	\$202,843,750	0.8734	\$177,163,731
3	\$464,750	\$0	\$172,213,000	\$0	\$0	\$0	\$0	\$172,677,750	0.8163	\$140,956,847
4	\$0	\$0	\$0	\$0	\$30,166,000	\$0	\$0	\$30,166,000	0.7629	\$23,013,641
5	\$0	\$0	\$0	\$0	\$0	\$5,669,000	\$308,000	\$5,977,000	0.7130	\$4,261,601
6	\$0	\$0	\$0	\$0	\$30,166,000	\$0	\$0	\$30,166,000	0.6663	\$20,099,606
7	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	0.6227	\$0
8	\$0	\$0	\$0	\$0	\$30,166,000	\$0	\$0	\$30,166,000	0.5820	\$17,556,612
9	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	0.5439	\$0
10	\$0	\$0	\$0	\$0	\$30,166,000	\$5,669,000	\$308,000	\$36,143,000	0.5083	\$18,371,487
11	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	0.4751	\$0
12	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	0.4440	\$0
13	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	0.4150	\$0
14	\$0	\$0	\$0	\$0	\$30,166,000	\$0	\$0	\$30,166,000	0.3878	\$11,698,375
15	\$0	\$0	\$0	\$0	\$0	\$5,669,000	\$308,000	\$5,977,000	0.3624	\$2,166,065
16	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	0.3387	\$0
17	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	0.3166	\$0
18	\$0	\$0	\$0	\$0	\$30,166,000	\$0	\$0	\$30,166,000	0.2959	\$8,926,119
19	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	0.2765	\$0
20	\$0	\$0	\$0	\$0	\$0	\$5,669,000	\$308,000	\$5,977,000	0.2584	\$1,544,457
21	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	0.2415	\$0
22	\$0	\$0	\$0	\$0	\$30,166,000	\$0	\$0	\$30,166,000	0.2257	\$6,808,466
23	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	0.2109	\$0
24	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	0.1971	\$0
25	\$0	\$0	\$0	\$0	\$0	\$5,669,000	\$308,000	\$5,977,000	0.1842	\$1,100,963
26	\$0	\$0	\$0	\$0	\$30,166,000	\$0	\$0	\$30,166,000	0.1722	\$5,194,585
27	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	0.1609	\$0
28	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	0.1504	\$0
29	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	0.1406	\$0
30	\$0	\$0	\$0	\$0	\$30,166,000	\$5,669,000	\$308,000	\$36,143,000	0.1314	\$4,749,190
31	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	0.1228	\$0
32	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	0.1147	\$0
33	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	0.1072	\$0
34	\$0	\$0	\$0	\$0	\$30,166,000	\$0	\$0	\$30,166,000	0.1002	\$3,022,633
35	\$0	\$0	\$0	\$0	\$0	\$5,669,000	\$308,000	\$5,977,000	0.0937	\$560,045
36	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	0.0875	\$0
37	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	0.0818	\$0
38	\$0	\$0	\$0	\$0	\$30,166,000	\$0	\$0	\$30,166,000	0.0765	\$2,307,699
39	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	0.0715	\$0
40	\$0	\$0	\$0	\$0	\$0	\$5,669,000	\$308,000	\$5,977,000	0.0668	\$399,264
41	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	0.0624	\$0
42	\$0	\$0	\$0	\$0	\$30,166,000	\$0	\$0	\$30,166,000	0.0583	\$1,758,678
43	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	0.0545	\$0
44	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	0.0509	\$0
45	\$0	\$0	\$0	\$0	\$0	\$5,669,000	\$308,000	\$5,977,000	0.0476	\$284,505
46	\$0	\$0	\$0	\$0	\$30,166,000	\$0	\$0	\$30,166,000	0.0445	\$1,342,387
47	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	0.0416	\$0
48	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	0.0389	\$0
49	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	0.0363	\$0
50	\$0	\$0	\$0	\$0	\$30,166,000	\$5,669,000	\$308,000	\$36,143,000	0.0339	\$1,225,248
51	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	0.0317	\$0
52	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	0.0297	\$0
53	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	0.0277	\$0
54	\$0	\$0	\$0	\$0	\$30,166,000	\$0	\$0	\$30,166,000	0.0259	\$781,299
55	\$0	\$0	\$0	\$0	\$0	\$5,669,000	\$308,000	\$5,977,000	0.0242	\$144,643
56	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	0.0226	\$0
57	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	0.0211	\$0
58	\$0	\$0	\$0	\$0	\$30,166,000	\$0	\$0	\$30,166,000	0.0198	\$597,287
59	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	0.0185	\$0
60	\$0	\$0	\$0	\$0	\$0	\$5,669,000	\$308,000	\$5,977,000	0.0173	\$103,402
61	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	0.0161	\$0
62	\$0	\$0	\$0	\$0	\$30,166,000	\$0	\$0	\$30,166,000	0.0151	\$455,507
63	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	0.0141	\$0
64	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	0.0132	\$0
65	\$0	\$0	\$0	\$0	\$0	\$5,669,000	\$308,000	\$5,977,000	0.0123	\$73,517
66	\$0	\$0	\$0	\$0	\$30,166,000	\$0	\$0	\$30,166,000	0.0115	\$346,909
67	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	0.0107	\$0
68	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	0.0100	\$0
69	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	0.0094	\$0
70	\$0	\$0	\$0	\$0	\$30,166,000	\$5,669,000	\$308,000	\$36,143,000	0.0088	\$318,058
71	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	0.0082	\$0
72	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	0.0077	\$0
73	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	0.0072	\$0
74	\$0	\$0	\$0	\$0	\$30,166,000	\$0	\$0	\$30,166,000	0.0067	\$202,112
75	\$0	\$0	\$0	\$0	\$0	\$5,669,000	\$308,000	\$5,977,000	0.0063	\$37,655

TABLE PV-B

## PRESENT VALUE ANALYSIS

Alternative B

Site: Portland Harbor Superfund Site  
 Location: Portland, Oregon  
 Phase: Draft Feasibility Study (-30% to +50%)  
 Base Year: 2015

Year <sup>1</sup>	Capital Costs (Institutional Controls) <sup>2</sup>	Capital Costs (Monitored Natural Recovery) <sup>2</sup>	Capital Costs (Technology Assignments) <sup>2</sup>	Annual O&M Costs	Periodic Costs (Long Term Monitoring and Monitored Natural Recovery)	Periodic Costs (Long Term Operations and Maintenance and Institutional Controls)	Periodic Costs (Five-Year Site Reviews)	Total Annual Expenditure <sup>3</sup>	Discount Factor (7.0%)	Present Value <sup>4</sup>
76	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	0.0058	\$0
77	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	0.0055	\$0
78	\$0	\$0	\$0	\$0	\$30,166,000	\$0	\$0	\$30,166,000	0.0051	\$153,847
79	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	0.0048	\$0
80	\$0	\$0	\$0	\$0	\$0	\$5,669,000	\$308,000	\$5,977,000	0.0045	\$26,897
81	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	0.0042	\$0
82	\$0	\$0	\$0	\$0	\$30,166,000	\$0	\$0	\$30,166,000	0.0039	\$117,647
83	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	0.0036	\$0
84	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	0.0034	\$0
85	\$0	\$0	\$0	\$0	\$0	\$5,669,000	\$308,000	\$5,977,000	0.0032	\$19,126
86	\$0	\$0	\$0	\$0	\$30,166,000	\$0	\$0	\$30,166,000	0.0030	\$90,498
87	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	0.0028	\$0
88	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	0.0026	\$0
89	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	0.0024	\$0
90	\$0	\$0	\$0	\$0	\$30,166,000	\$5,669,000	\$308,000	\$36,143,000	0.0023	\$83,129
91	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	0.0021	\$0
92	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	0.0020	\$0
93	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	0.0019	\$0
94	\$0	\$0	\$0	\$0	\$30,166,000	\$0	\$0	\$30,166,000	0.0017	\$51,282
95	\$0	\$0	\$0	\$0	\$0	\$5,669,000	\$308,000	\$5,977,000	0.0016	\$9,563
96	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	0.0015	\$0
97	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	0.0014	\$0
98	\$0	\$0	\$0	\$0	\$30,166,000	\$0	\$0	\$30,166,000	0.0013	\$39,216
99	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	0.0012	\$0
100	\$0	\$0	\$0	\$0	\$0	\$5,669,000	\$308,000	\$5,977,000	0.0012	\$7,172
<b>TOTALS:</b>	\$1,859,000	\$13,195,000	\$688,852,000	\$0	\$814,482,000	\$113,380,000	\$6,160,000	\$1,637,928,000		\$805,428,345
<b>TOTAL PRESENT VALUE OF ALTERNATIVE B<sup>5</sup></b>										<b>\$805,430,000</b>

**Notes:**

<sup>1</sup> The alternative is expected to require cost expenditures for perpetuity since some contamination within the sediment bed and associated riverbank soils would remain in-place that do not allow for unrestricted use or unlimited exposure to human or ecological receptors. However the period of analysis was assumed to be 100 yrs beyond the construction in Year 0.

<sup>2</sup> Capital costs, for purposes of this analysis, are assumed to be distributed as indicated on Table CS-B.

<sup>3</sup> Total annual expenditure is the total cost per year with no discounting.

<sup>4</sup> Present value is the total cost per year including a 7.0% discount factor for that year. See Table PV-ADRFT for details.

<sup>5</sup> Total present value is rounded to the nearest \$10,000. Inflation and depreciation are excluded from the present value cost.

Costs presented for this alternative are expected to have an accuracy between -30% to +50% of actual costs, based on the scope presented.

They are prepared solely to facilitate relative comparisons between alternatives for FS evaluation purposes.

TABLE PV-D

## PRESENT VALUE ANALYSIS

Alternative D

Site: Portland Harbor Superfund Site  
 Location: Portland, Oregon  
 Phase: Draft Feasibility Study (-30% to +50%)  
 Base Year: 2015

Year <sup>1</sup>	Capital Costs (Institutional Controls) <sup>2</sup>	Capital Costs (Monitored Natural Recovery) <sup>2</sup>	Capital Costs (Technology Assignments) <sup>2</sup>	Annual O&M Costs	Periodic Costs (Long Term Monitoring and Monitored Natural Recovery)	Periodic Costs (Long Term Operations and Maintenance and Institutional Controls)	Periodic Costs (Five-Year Site Reviews)	Total Annual Expenditure <sup>3</sup>	Discount Factor (7.0%)	Present Value <sup>4</sup>
0	\$371,800	\$12,766,000	\$201,675,800	\$0	\$0	\$0	\$0	\$214,813,600	1.0000	\$214,813,600
1	\$371,800	\$0	\$201,675,800	\$0	\$0	\$0	\$0	\$202,047,600	0.9346	\$188,833,687
2	\$371,800	\$0	\$201,675,800	\$0	\$40,482,000	\$0	\$0	\$242,529,600	0.8734	\$211,825,353
3	\$371,800	\$0	\$201,675,800	\$0	\$0	\$0	\$0	\$202,047,600	0.8163	\$164,931,456
4	\$371,800	\$0	\$201,675,800	\$0	\$40,482,000	\$0	\$0	\$242,529,600	0.7629	\$185,025,832
5	\$0	\$0	\$0	\$0	\$0	\$8,917,000	\$308,000	\$9,225,000	0.7130	\$6,577,425
6	\$0	\$0	\$0	\$0	\$40,482,000	\$0	\$0	\$40,482,000	0.6663	\$26,973,157
7	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	0.6227	\$0
8	\$0	\$0	\$0	\$0	\$40,482,000	\$0	\$0	\$40,482,000	0.5820	\$23,560,524
9	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	0.5439	\$0
10	\$0	\$0	\$0	\$0	\$40,482,000	\$8,917,000	\$308,000	\$49,707,000	0.5083	\$25,266,068
11	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	0.4751	\$0
12	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	0.4440	\$0
13	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	0.4150	\$0
14	\$0	\$0	\$0	\$0	\$40,482,000	\$0	\$0	\$40,482,000	0.3878	\$15,698,920
15	\$0	\$0	\$0	\$0	\$0	\$8,917,000	\$308,000	\$9,225,000	0.3624	\$3,343,140
16	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	0.3387	\$0
17	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	0.3166	\$0
18	\$0	\$0	\$0	\$0	\$40,482,000	\$0	\$0	\$40,482,000	0.2959	\$11,978,624
19	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	0.2765	\$0
20	\$0	\$0	\$0	\$0	\$0	\$8,917,000	\$308,000	\$9,225,000	0.2584	\$2,383,740
21	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	0.2415	\$0
22	\$0	\$0	\$0	\$0	\$40,482,000	\$0	\$0	\$40,482,000	0.2257	\$9,136,787
23	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	0.2109	\$0
24	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	0.1971	\$0
25	\$0	\$0	\$0	\$0	\$0	\$8,917,000	\$308,000	\$9,225,000	0.1842	\$1,699,245
26	\$0	\$0	\$0	\$0	\$40,482,000	\$0	\$0	\$40,482,000	0.1722	\$6,971,000
27	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	0.1609	\$0
28	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	0.1504	\$0
29	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	0.1406	\$0
30	\$0	\$0	\$0	\$0	\$40,482,000	\$8,917,000	\$308,000	\$49,707,000	0.1314	\$6,531,500
31	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	0.1228	\$0
32	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	0.1147	\$0
33	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	0.1072	\$0
34	\$0	\$0	\$0	\$0	\$40,482,000	\$0	\$0	\$40,482,000	0.1002	\$4,056,296
35	\$0	\$0	\$0	\$0	\$0	\$8,917,000	\$308,000	\$9,225,000	0.0937	\$864,383
36	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	0.0875	\$0
37	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	0.0818	\$0
38	\$0	\$0	\$0	\$0	\$40,482,000	\$0	\$0	\$40,482,000	0.0765	\$3,096,873
39	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	0.0715	\$0
40	\$0	\$0	\$0	\$0	\$0	\$8,917,000	\$308,000	\$9,225,000	0.0668	\$616,230
41	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	0.0624	\$0
42	\$0	\$0	\$0	\$0	\$40,482,000	\$0	\$0	\$40,482,000	0.0583	\$2,360,101
43	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	0.0545	\$0
44	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	0.0509	\$0
45	\$0	\$0	\$0	\$0	\$0	\$8,917,000	\$308,000	\$9,225,000	0.0476	\$439,110
46	\$0	\$0	\$0	\$0	\$40,482,000	\$0	\$0	\$40,482,000	0.0445	\$1,801,449
47	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	0.0416	\$0
48	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	0.0389	\$0
49	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	0.0363	\$0
50	\$0	\$0	\$0	\$0	\$40,482,000	\$8,917,000	\$308,000	\$49,707,000	0.0339	\$1,685,067
51	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	0.0317	\$0
52	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	0.0297	\$0
53	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	0.0277	\$0
54	\$0	\$0	\$0	\$0	\$40,482,000	\$0	\$0	\$40,482,000	0.0259	\$1,048,484
55	\$0	\$0	\$0	\$0	\$0	\$8,917,000	\$308,000	\$9,225,000	0.0242	\$223,245
56	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	0.0226	\$0
57	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	0.0211	\$0
58	\$0	\$0	\$0	\$0	\$40,482,000	\$0	\$0	\$40,482,000	0.0198	\$801,544
59	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	0.0185	\$0
60	\$0	\$0	\$0	\$0	\$0	\$8,917,000	\$308,000	\$9,225,000	0.0173	\$159,593
61	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	0.0161	\$0
62	\$0	\$0	\$0	\$0	\$40,482,000	\$0	\$0	\$40,482,000	0.0151	\$611,278
63	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	0.0141	\$0
64	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	0.0132	\$0
65	\$0	\$0	\$0	\$0	\$0	\$8,917,000	\$308,000	\$9,225,000	0.0123	\$113,468
66	\$0	\$0	\$0	\$0	\$40,482,000	\$0	\$0	\$40,482,000	0.0115	\$465,543
67	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	0.0107	\$0
68	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	0.0100	\$0
69	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	0.0094	\$0
70	\$0	\$0	\$0	\$0	\$40,482,000	\$8,917,000	\$308,000	\$49,707,000	0.0088	\$437,422
71	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	0.0082	\$0
72	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	0.0077	\$0
73	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	0.0072	\$0
74	\$0	\$0	\$0	\$0	\$40,482,000	\$0	\$0	\$40,482,000	0.0067	\$271,229
75	\$0	\$0	\$0	\$0	\$0	\$8,917,000	\$308,000	\$9,225,000	0.0063	\$58,118

TABLE PV-D

## PRESENT VALUE ANALYSIS

Alternative D

Site: Portland Harbor Superfund Site  
 Location: Portland, Oregon  
 Phase: Draft Feasibility Study (-30% to +50%)  
 Base Year: 2015

Year <sup>1</sup>	Capital Costs (Institutional Controls) <sup>2</sup>	Capital Costs (Monitored Natural Recovery) <sup>2</sup>	Capital Costs (Technology Assignments) <sup>2</sup>	Annual O&M Costs	Periodic Costs (Long Term Monitoring and Monitored Natural Recovery)	Periodic Costs (Long Term Operations and Maintenance and Institutional Controls)	Periodic Costs (Five-Year Site Reviews)	Total Annual Expenditure <sup>3</sup>	Discount Factor (7.0%)	Present Value <sup>4</sup>
76	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	0.0058	\$0
77	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	0.0055	\$0
78	\$0	\$0	\$0	\$0	\$40,482,000	\$0	\$0	\$40,482,000	0.0051	\$206,458
79	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	0.0048	\$0
80	\$0	\$0	\$0	\$0	\$0	\$8,917,000	\$308,000	\$9,225,000	0.0045	\$41,513
81	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	0.0042	\$0
82	\$0	\$0	\$0	\$0	\$40,482,000	\$0	\$0	\$40,482,000	0.0039	\$157,880
83	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	0.0036	\$0
84	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	0.0034	\$0
85	\$0	\$0	\$0	\$0	\$0	\$8,917,000	\$308,000	\$9,225,000	0.0032	\$29,520
86	\$0	\$0	\$0	\$0	\$40,482,000	\$0	\$0	\$40,482,000	0.0030	\$121,446
87	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	0.0028	\$0
88	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	0.0026	\$0
89	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	0.0024	\$0
90	\$0	\$0	\$0	\$0	\$40,482,000	\$8,917,000	\$308,000	\$49,707,000	0.0023	\$114,326
91	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	0.0021	\$0
92	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	0.0020	\$0
93	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	0.0019	\$0
94	\$0	\$0	\$0	\$0	\$40,482,000	\$0	\$0	\$40,482,000	0.0017	\$68,819
95	\$0	\$0	\$0	\$0	\$0	\$8,917,000	\$308,000	\$9,225,000	0.0016	\$14,760
96	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	0.0015	\$0
97	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	0.0014	\$0
98	\$0	\$0	\$0	\$0	\$40,482,000	\$0	\$0	\$40,482,000	0.0013	\$52,627
99	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	0.0012	\$0
100	\$0	\$0	\$0	\$0	\$0	\$8,917,000	\$308,000	\$9,225,000	0.0012	\$11,070
<b>TOTALS:</b>	\$1,859,000	\$12,766,000	\$1,008,379,000	\$0	\$1,093,014,000	\$178,340,000	\$6,160,000	\$2,300,518,000		\$1,125,477,910
<b>TOTAL PRESENT VALUE OF ALTERNATIVE D<sup>5</sup></b>										<b>\$1,125,480,000</b>

**Notes:**

<sup>1</sup> The alternative is expected to require cost expenditures for perpetuity since some contamination within the sediment bed and associated riverbank soils would remain in-place that do not allow for unrestricted use or unlimited exposure to human or ecological receptors. However the period of analysis was assumed to be 100 yrs beyond the construction in Year 0.

<sup>2</sup> Capital costs, for purposes of this analysis, are assumed to be distributed as indicated on Table CS-D.

<sup>3</sup> Total annual expenditure is the total cost per year with no discounting.

<sup>4</sup> Present value is the total cost per year including a 7.0% discount factor for that year. See Table PV-ADRFT for details.

<sup>5</sup> Total present value is rounded to the nearest \$10,000. Inflation and depreciation are excluded from the present value cost.

Costs presented for this alternative are expected to have an accuracy between -30% to +50% of actual costs, based on the scope presented.

They are prepared solely to facilitate relative comparisons between alternatives for FS evaluation purposes.

TABLE PV-E

## PRESENT VALUE ANALYSIS

Alternative E

Site: Portland Harbor Superfund Site  
 Location: Portland, Oregon  
 Phase: Draft Feasibility Study (-30% to +50%)  
 Base Year: 2015

Year <sup>1</sup>	Capital Costs (Institutional Controls) <sup>2</sup>	Capital Costs (Monitored Natural Recovery) <sup>2</sup>	Capital Costs (Technology Assignments) <sup>2</sup>	Annual O&M Costs	Periodic Costs (Long Term Monitoring and Monitored Natural Recovery)	Periodic Costs (Long Term Operations and Maintenance and Institutional Controls)	Periodic Costs (Five-Year Site Reviews)	Total Annual Expenditure <sup>3</sup>	Discount Factor (7.0%)	Present Value <sup>4</sup>
0	\$265,571	\$12,270,000	\$205,517,000	\$0	\$0	\$0	\$0	\$218,052,571	1.0000	\$218,052,571
1	\$265,571	\$0	\$205,517,000	\$0	\$0	\$0	\$0	\$205,782,571	0.9346	\$192,324,391
2	\$265,571	\$0	\$205,517,000	\$0	\$56,733,000	\$0	\$0	\$262,515,571	0.8734	\$229,281,100
3	\$265,571	\$0	\$205,517,000	\$0	\$0	\$0	\$0	\$205,782,571	0.8163	\$167,980,313
4	\$265,571	\$0	\$205,517,000	\$0	\$56,733,000	\$0	\$0	\$262,515,571	0.7629	\$200,273,129
5	\$265,571	\$0	\$205,517,000	\$0	\$0	\$13,776,000	\$308,000	\$219,866,571	0.7130	\$156,764,865
6	\$265,571	\$0	\$205,517,000	\$0	\$56,733,000	\$0	\$0	\$262,515,571	0.6663	\$174,914,125
7	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	0.6227	\$0
8	\$0	\$0	\$0	\$0	\$56,733,000	\$0	\$0	\$56,733,000	0.5820	\$33,018,606
9	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	0.5439	\$0
10	\$0	\$0	\$0	\$0	\$56,733,000	\$13,776,000	\$308,000	\$70,817,000	0.5083	\$35,996,281
11	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	0.4751	\$0
12	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	0.4440	\$0
13	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	0.4150	\$0
14	\$0	\$0	\$0	\$0	\$56,733,000	\$0	\$0	\$56,733,000	0.3878	\$22,001,057
15	\$0	\$0	\$0	\$0	\$0	\$13,776,000	\$308,000	\$14,084,000	0.3624	\$5,104,042
16	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	0.3387	\$0
17	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	0.3166	\$0
18	\$0	\$0	\$0	\$0	\$56,733,000	\$0	\$0	\$56,733,000	0.2959	\$16,787,295
19	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	0.2765	\$0
20	\$0	\$0	\$0	\$0	\$0	\$13,776,000	\$308,000	\$14,084,000	0.2584	\$3,639,306
21	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	0.2415	\$0
22	\$0	\$0	\$0	\$0	\$56,733,000	\$0	\$0	\$56,733,000	0.2257	\$12,804,638
23	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	0.2109	\$0
24	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	0.1971	\$0
25	\$0	\$0	\$0	\$0	\$0	\$13,776,000	\$308,000	\$14,084,000	0.1842	\$2,594,273
26	\$0	\$0	\$0	\$0	\$56,733,000	\$0	\$0	\$56,733,000	0.1722	\$9,769,423
27	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	0.1609	\$0
28	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	0.1504	\$0
29	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	0.1406	\$0
30	\$0	\$0	\$0	\$0	\$56,733,000	\$13,776,000	\$308,000	\$70,817,000	0.1314	\$9,305,354
31	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	0.1228	\$0
32	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	0.1147	\$0
33	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	0.1072	\$0
34	\$0	\$0	\$0	\$0	\$56,733,000	\$0	\$0	\$56,733,000	0.1002	\$5,684,647
35	\$0	\$0	\$0	\$0	\$0	\$13,776,000	\$308,000	\$14,084,000	0.0937	\$1,319,671
36	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	0.0875	\$0
37	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	0.0818	\$0
38	\$0	\$0	\$0	\$0	\$56,733,000	\$0	\$0	\$56,733,000	0.0765	\$4,340,075
39	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	0.0715	\$0
40	\$0	\$0	\$0	\$0	\$0	\$13,776,000	\$308,000	\$14,084,000	0.0668	\$940,811
41	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	0.0624	\$0
42	\$0	\$0	\$0	\$0	\$56,733,000	\$0	\$0	\$56,733,000	0.0583	\$3,307,534
43	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	0.0545	\$0
44	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	0.0509	\$0
45	\$0	\$0	\$0	\$0	\$0	\$13,776,000	\$308,000	\$14,084,000	0.0476	\$670,398
46	\$0	\$0	\$0	\$0	\$56,733,000	\$0	\$0	\$56,733,000	0.0445	\$2,524,619
47	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	0.0416	\$0
48	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	0.0389	\$0
49	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	0.0363	\$0
50	\$0	\$0	\$0	\$0	\$56,733,000	\$13,776,000	\$308,000	\$70,817,000	0.0339	\$2,400,696
51	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	0.0317	\$0
52	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	0.0297	\$0
53	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	0.0277	\$0
54	\$0	\$0	\$0	\$0	\$56,733,000	\$0	\$0	\$56,733,000	0.0259	\$1,469,385
55	\$0	\$0	\$0	\$0	\$0	\$13,776,000	\$308,000	\$14,084,000	0.0242	\$340,833
56	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	0.0226	\$0
57	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	0.0211	\$0
58	\$0	\$0	\$0	\$0	\$56,733,000	\$0	\$0	\$56,733,000	0.0198	\$1,123,313
59	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	0.0185	\$0
60	\$0	\$0	\$0	\$0	\$0	\$13,776,000	\$308,000	\$14,084,000	0.0173	\$243,653
61	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	0.0161	\$0
62	\$0	\$0	\$0	\$0	\$56,733,000	\$0	\$0	\$56,733,000	0.0151	\$856,668
63	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	0.0141	\$0
64	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	0.0132	\$0
65	\$0	\$0	\$0	\$0	\$0	\$13,776,000	\$308,000	\$14,084,000	0.0123	\$173,233
66	\$0	\$0	\$0	\$0	\$56,733,000	\$0	\$0	\$56,733,000	0.0115	\$652,430
67	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	0.0107	\$0
68	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	0.0100	\$0
69	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	0.0094	\$0
70	\$0	\$0	\$0	\$0	\$56,733,000	\$13,776,000	\$308,000	\$70,817,000	0.0088	\$623,190
71	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	0.0082	\$0
72	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	0.0077	\$0
73	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	0.0072	\$0
74	\$0	\$0	\$0	\$0	\$56,733,000	\$0	\$0	\$56,733,000	0.0067	\$380,111
75	\$0	\$0	\$0	\$0	\$0	\$13,776,000	\$308,000	\$14,084,000	0.0063	\$88,729

TABLE PV-E

## PRESENT VALUE ANALYSIS

Alternative E

Site: Portland Harbor Superfund Site  
 Location: Portland, Oregon  
 Phase: Draft Feasibility Study (-30% to +50%)  
 Base Year: 2015

Year <sup>1</sup>	Capital Costs (Institutional Controls) <sup>2</sup>	Capital Costs (Monitored Natural Recovery) <sup>2</sup>	Capital Costs (Technology Assignments) <sup>2</sup>	Annual O&M Costs	Periodic Costs (Long Term Monitoring and Monitored Natural Recovery)	Periodic Costs (Long Term Operations and Maintenance and Institutional Controls)	Periodic Costs (Five-Year Site Reviews)	Total Annual Expenditure <sup>3</sup>	Discount Factor (7.0%)	Present Value <sup>4</sup>
76	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	0.0058	\$0
77	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	0.0055	\$0
78	\$0	\$0	\$0	\$0	\$56,733,000	\$0	\$0	\$56,733,000	0.0051	\$289,338
79	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	0.0048	\$0
80	\$0	\$0	\$0	\$0	\$0	\$13,776,000	\$308,000	\$14,084,000	0.0045	\$63,378
81	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	0.0042	\$0
82	\$0	\$0	\$0	\$0	\$56,733,000	\$0	\$0	\$56,733,000	0.0039	\$221,259
83	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	0.0036	\$0
84	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	0.0034	\$0
85	\$0	\$0	\$0	\$0	\$0	\$13,776,000	\$308,000	\$14,084,000	0.0032	\$45,069
86	\$0	\$0	\$0	\$0	\$56,733,000	\$0	\$0	\$56,733,000	0.0030	\$170,199
87	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	0.0028	\$0
88	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	0.0026	\$0
89	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	0.0024	\$0
90	\$0	\$0	\$0	\$0	\$56,733,000	\$13,776,000	\$308,000	\$70,817,000	0.0023	\$162,879
91	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	0.0021	\$0
92	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	0.0020	\$0
93	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	0.0019	\$0
94	\$0	\$0	\$0	\$0	\$56,733,000	\$0	\$0	\$56,733,000	0.0017	\$96,446
95	\$0	\$0	\$0	\$0	\$0	\$13,776,000	\$308,000	\$14,084,000	0.0016	\$22,534
96	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	0.0015	\$0
97	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	0.0014	\$0
98	\$0	\$0	\$0	\$0	\$56,733,000	\$0	\$0	\$56,733,000	0.0013	\$73,753
99	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	0.0012	\$0
100	\$0	\$0	\$0	\$0	\$0	\$13,776,000	\$308,000	\$14,084,000	0.0012	\$16,901
<b>TOTALS:</b>	\$1,859,000	\$12,270,000	\$1,438,619,000	\$0	\$1,531,791,000	\$275,520,000	\$6,160,000	\$3,266,219,000		\$1,518,912,521
<b>TOTAL PRESENT VALUE OF ALTERNATIVE E<sup>5</sup></b>										<b>\$1,518,910,000</b>

**Notes:**

<sup>1</sup> The alternative is expected to require cost expenditures for perpetuity since some contamination within the sediment bed and associated riverbank soils would remain in-place that do not allow for unrestricted use or unlimited exposure to human or ecological receptors. However the period of analysis was assumed to be 100 yrs beyond the construction in Year 0.

<sup>2</sup> Capital costs, for purposes of this analysis, are assumed to be distributed as indicated on Table CS-E.

<sup>3</sup> Total annual expenditure is the total cost per year with no discounting.

<sup>4</sup> Present value is the total cost per year including a 7.0% discount factor for that year. See Table PV-ADRFT for details.

<sup>5</sup> Total present value is rounded to the nearest \$10,000. Inflation and depreciation are excluded from the present value cost.

Costs presented for this alternative are expected to have an accuracy between -30% to +50% of actual costs, based on the scope presented.

They are prepared solely to facilitate relative comparisons between alternatives for FS evaluation purposes.

TABLE PV-F

## PRESENT VALUE ANALYSIS

Alternative F

Site: Portland Harbor Superfund Site  
 Location: Portland, Oregon  
 Phase: Draft Feasibility Study (-30% to +50%)  
 Base Year: 2015

Year <sup>1</sup>	Capital Costs (Institutional Controls) <sup>2</sup>	Capital Costs (Monitored Natural Recovery) <sup>2</sup>	Capital Costs (Technology Assignments) <sup>2</sup>	Annual O&M Costs	Periodic Costs (Long Term Monitoring and Monitored Natural Recovery)	Periodic Costs (Long Term Operations and Maintenance and Institutional Controls)	Periodic Costs (Five-Year Site Reviews)	Total Annual Expenditure <sup>3</sup>	Discount Factor (7.0%)	Present Value <sup>4</sup>
0	\$154,917	\$11,198,000	\$197,978,417	\$0	\$0	\$0	\$0	\$209,331,334	1.0000	\$209,331,334
1	\$154,917	\$0	\$197,978,417	\$0	\$0	\$0	\$0	\$198,133,334	0.9346	\$185,175,414
2	\$154,917	\$0	\$197,978,417	\$0	\$69,065,000	\$0	\$0	\$267,198,334	0.8734	\$233,371,025
3	\$154,917	\$0	\$197,978,417	\$0	\$0	\$0	\$0	\$198,133,334	0.8163	\$161,736,241
4	\$154,917	\$0	\$197,978,417	\$0	\$69,065,000	\$0	\$0	\$267,198,334	0.7629	\$203,845,609
5	\$154,917	\$0	\$197,978,417	\$0	\$0	\$18,442,000	\$308,000	\$216,883,334	0.7130	\$154,637,817
6	\$154,917	\$0	\$197,978,417	\$0	\$69,065,000	\$0	\$0	\$267,198,334	0.6663	\$178,034,250
7	\$154,917	\$0	\$197,978,417	\$0	\$0	\$0	\$0	\$198,133,334	0.6227	\$123,377,627
8	\$154,917	\$0	\$197,978,417	\$0	\$69,065,000	\$0	\$0	\$267,198,334	0.5820	\$155,509,430
9	\$154,917	\$0	\$197,978,417	\$0	\$0	\$0	\$0	\$198,133,334	0.5439	\$107,764,720
10	\$154,917	\$0	\$197,978,417	\$0	\$69,065,000	\$18,442,000	\$308,000	\$285,948,334	0.5083	\$145,347,538
11	\$154,917	\$0	\$197,978,417	\$0	\$0	\$0	\$0	\$198,133,334	0.4751	\$94,133,147
12	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	0.4440	\$0
13	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	0.4150	\$0
14	\$0	\$0	\$0	\$0	\$69,065,000	\$0	\$0	\$69,065,000	0.3878	\$26,783,407
15	\$0	\$0	\$0	\$0	\$0	\$18,442,000	\$308,000	\$18,750,000	0.3624	\$6,795,000
16	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	0.3387	\$0
17	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	0.3166	\$0
18	\$0	\$0	\$0	\$0	\$69,065,000	\$0	\$0	\$69,065,000	0.2959	\$20,436,334
19	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	0.2765	\$0
20	\$0	\$0	\$0	\$0	\$0	\$18,442,000	\$308,000	\$18,750,000	0.2584	\$4,845,000
21	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	0.2415	\$0
22	\$0	\$0	\$0	\$0	\$69,065,000	\$0	\$0	\$69,065,000	0.2257	\$15,587,971
23	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	0.2109	\$0
24	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	0.1971	\$0
25	\$0	\$0	\$0	\$0	\$0	\$18,442,000	\$308,000	\$18,750,000	0.1842	\$3,453,750
26	\$0	\$0	\$0	\$0	\$69,065,000	\$0	\$0	\$69,065,000	0.1722	\$11,892,993
27	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	0.1609	\$0
28	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	0.1504	\$0
29	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	0.1406	\$0
30	\$0	\$0	\$0	\$0	\$69,065,000	\$18,442,000	\$308,000	\$87,815,000	0.1314	\$11,538,891
31	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	0.1228	\$0
32	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	0.1147	\$0
33	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	0.1072	\$0
34	\$0	\$0	\$0	\$0	\$69,065,000	\$0	\$0	\$69,065,000	0.1002	\$6,920,313
35	\$0	\$0	\$0	\$0	\$0	\$18,442,000	\$308,000	\$18,750,000	0.0937	\$1,756,875
36	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	0.0875	\$0
37	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	0.0818	\$0
38	\$0	\$0	\$0	\$0	\$69,065,000	\$0	\$0	\$69,065,000	0.0765	\$5,283,473
39	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	0.0715	\$0
40	\$0	\$0	\$0	\$0	\$0	\$18,442,000	\$308,000	\$18,750,000	0.0668	\$1,252,500
41	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	0.0624	\$0
42	\$0	\$0	\$0	\$0	\$69,065,000	\$0	\$0	\$69,065,000	0.0583	\$4,026,490
43	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	0.0545	\$0
44	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	0.0509	\$0
45	\$0	\$0	\$0	\$0	\$0	\$18,442,000	\$308,000	\$18,750,000	0.0476	\$892,500
46	\$0	\$0	\$0	\$0	\$69,065,000	\$0	\$0	\$69,065,000	0.0445	\$3,073,393
47	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	0.0416	\$0
48	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	0.0389	\$0
49	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	0.0363	\$0
50	\$0	\$0	\$0	\$0	\$69,065,000	\$18,442,000	\$308,000	\$87,815,000	0.0339	\$2,976,929
51	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	0.0317	\$0
52	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	0.0297	\$0
53	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	0.0277	\$0
54	\$0	\$0	\$0	\$0	\$69,065,000	\$0	\$0	\$69,065,000	0.0259	\$1,788,784
55	\$0	\$0	\$0	\$0	\$0	\$18,442,000	\$308,000	\$18,750,000	0.0242	\$453,750
56	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	0.0226	\$0
57	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	0.0211	\$0
58	\$0	\$0	\$0	\$0	\$69,065,000	\$0	\$0	\$69,065,000	0.0198	\$1,367,487
59	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	0.0185	\$0
60	\$0	\$0	\$0	\$0	\$0	\$18,442,000	\$308,000	\$18,750,000	0.0173	\$324,375
61	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	0.0161	\$0
62	\$0	\$0	\$0	\$0	\$69,065,000	\$0	\$0	\$69,065,000	0.0151	\$1,042,882
63	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	0.0141	\$0
64	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	0.0132	\$0
65	\$0	\$0	\$0	\$0	\$0	\$18,442,000	\$308,000	\$18,750,000	0.0123	\$230,625
66	\$0	\$0	\$0	\$0	\$69,065,000	\$0	\$0	\$69,065,000	0.0115	\$794,248
67	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	0.0107	\$0
68	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	0.0100	\$0
69	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	0.0094	\$0
70	\$0	\$0	\$0	\$0	\$69,065,000	\$18,442,000	\$308,000	\$87,815,000	0.0088	\$772,772
71	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	0.0082	\$0
72	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	0.0077	\$0
73	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	0.0072	\$0
74	\$0	\$0	\$0	\$0	\$69,065,000	\$0	\$0	\$69,065,000	0.0067	\$462,736
75	\$0	\$0	\$0	\$0	\$0	\$18,442,000	\$308,000	\$18,750,000	0.0063	\$118,125



TABLE PV-F

## PRESENT VALUE ANALYSIS

Alternative F

Site: Portland Harbor Superfund Site  
 Location: Portland, Oregon  
 Phase: Draft Feasibility Study (-30% to +50%)  
 Base Year: 2015

Year <sup>1</sup>	Capital Costs (Institutional Controls) <sup>2</sup>	Capital Costs (Monitored Natural Recovery) <sup>2</sup>	Capital Costs (Technology Assignments) <sup>2</sup>	Annual O&M Costs	Periodic Costs (Long Term Monitoring and Monitored Natural Recovery)	Periodic Costs (Long Term Operations and Maintenance and Institutional Controls)	Periodic Costs (Five-Year Site Reviews)	Total Annual Expenditure <sup>3</sup>	Discount Factor (7.0%)	Present Value <sup>4</sup>
76	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	0.0058	\$0
77	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	0.0055	\$0
78	\$0	\$0	\$0	\$0	\$69,065,000	\$0	\$0	\$69,065,000	0.0051	\$352,232
79	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	0.0048	\$0
80	\$0	\$0	\$0	\$0	\$0	\$18,442,000	\$308,000	\$18,750,000	0.0045	\$84,375
81	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	0.0042	\$0
82	\$0	\$0	\$0	\$0	\$69,065,000	\$0	\$0	\$69,065,000	0.0039	\$269,354
83	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	0.0036	\$0
84	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	0.0034	\$0
85	\$0	\$0	\$0	\$0	\$0	\$18,442,000	\$308,000	\$18,750,000	0.0032	\$60,000
86	\$0	\$0	\$0	\$0	\$69,065,000	\$0	\$0	\$69,065,000	0.0030	\$207,195
87	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	0.0028	\$0
88	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	0.0026	\$0
89	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	0.0024	\$0
90	\$0	\$0	\$0	\$0	\$69,065,000	\$18,442,000	\$308,000	\$87,815,000	0.0023	\$201,975
91	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	0.0021	\$0
92	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	0.0020	\$0
93	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	0.0019	\$0
94	\$0	\$0	\$0	\$0	\$69,065,000	\$0	\$0	\$69,065,000	0.0017	\$117,411
95	\$0	\$0	\$0	\$0	\$0	\$18,442,000	\$308,000	\$18,750,000	0.0016	\$30,000
96	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	0.0015	\$0
97	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	0.0014	\$0
98	\$0	\$0	\$0	\$0	\$69,065,000	\$0	\$0	\$69,065,000	0.0013	\$89,785
99	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	0.0012	\$0
100	\$0	\$0	\$0	\$0	\$0	\$18,442,000	\$308,000	\$18,750,000	0.0012	\$22,500
<b>TOTALS:</b>	\$1,859,000	\$11,198,000	\$2,375,741,000	\$0	\$1,864,755,000	\$368,840,000	\$6,160,000	\$4,628,553,000		\$2,088,570,582
<b>TOTAL PRESENT VALUE OF ALTERNATIVE F<sup>5</sup></b>										<b>\$2,088,570,000</b>

**Notes:**

<sup>1</sup> The alternative is expected to require cost expenditures for perpetuity since some contamination within the sediment bed and associated riverbank soils would remain in-place that do not allow for unrestricted use or unlimited exposure to human or ecological receptors. However the period of analysis was assumed to be 100 yrs beyond the construction in Year 0.

<sup>2</sup> Capital costs, for purposes of this analysis, are assumed to be distributed as indicated on Table CS-F.

<sup>3</sup> Total annual expenditure is the total cost per year with no discounting.

<sup>4</sup> Present value is the total cost per year including a 7.0% discount factor for that year. See Table PV-ADRFT for details.

<sup>5</sup> Total present value is rounded to the nearest \$10,000. Inflation and depreciation are excluded from the present value cost.

Costs presented for this alternative are expected to have an accuracy between -30% to +50% of actual costs, based on the scope presented.

They are prepared solely to facilitate relative comparisons between alternatives for FS evaluation purposes.

TABLE PV-G

## PRESENT VALUE ANALYSIS

Alternative G

Site: Portland Harbor Superfund Site  
 Location: Portland, Oregon  
 Phase: Draft Feasibility Study (-30% to +50%)  
 Base Year: 2015

Year <sup>1</sup>	Capital Costs (Institutional Controls) <sup>2</sup>	Capital Costs (Monitored Natural Recovery) <sup>2</sup>	Capital Costs (Technology Assignments) <sup>2</sup>	Annual O&M Costs	Periodic Costs (Long Term Monitoring and Monitored Natural Recovery)	Periodic Costs (Long Term Operations and Maintenance and Institutional Controls)	Periodic Costs (Five-Year Site Reviews)	Total Annual Expenditure <sup>3</sup>	Discount Factor (7.0%)	Present Value <sup>4</sup>
0	\$103,278	\$9,795,000	\$185,778,500	\$0	\$0	\$0	\$0	\$195,676,778	1.0000	\$195,676,778
1	\$103,278	\$0	\$185,778,500	\$0	\$0	\$0	\$0	\$185,881,778	0.9346	\$173,725,110
2	\$103,278	\$0	\$185,778,500	\$0	\$83,592,000	\$0	\$0	\$269,473,778	0.8734	\$235,358,398
3	\$103,278	\$0	\$185,778,500	\$0	\$0	\$0	\$0	\$185,881,778	0.8163	\$151,735,295
4	\$103,278	\$0	\$185,778,500	\$0	\$83,592,000	\$0	\$0	\$269,473,778	0.7629	\$205,581,545
5	\$103,278	\$0	\$185,778,500	\$0	\$0	\$23,326,000	\$308,000	\$209,515,778	0.7130	\$149,384,750
6	\$103,278	\$0	\$185,778,500	\$0	\$83,592,000	\$0	\$0	\$269,473,778	0.6663	\$179,550,378
7	\$103,278	\$0	\$185,778,500	\$0	\$0	\$0	\$0	\$185,881,778	0.6227	\$115,748,583
8	\$103,278	\$0	\$185,778,500	\$0	\$83,592,000	\$0	\$0	\$269,473,778	0.5820	\$156,833,739
9	\$103,278	\$0	\$185,778,500	\$0	\$0	\$0	\$0	\$185,881,778	0.5439	\$101,101,099
10	\$103,278	\$0	\$185,778,500	\$0	\$83,592,000	\$23,326,000	\$308,000	\$293,107,778	0.5083	\$148,986,684
11	\$103,278	\$0	\$185,778,500	\$0	\$0	\$0	\$0	\$185,881,778	0.4751	\$88,312,433
12	\$103,278	\$0	\$185,778,500	\$0	\$0	\$0	\$0	\$185,881,778	0.4440	\$82,531,509
13	\$103,278	\$0	\$185,778,500	\$0	\$0	\$0	\$0	\$185,881,778	0.4150	\$77,140,938
14	\$103,278	\$0	\$185,778,500	\$0	\$83,592,000	\$0	\$0	\$269,473,778	0.3878	\$104,501,931
15	\$103,278	\$0	\$185,778,500	\$0	\$0	\$23,326,000	\$308,000	\$209,515,778	0.3624	\$75,928,518
16	\$103,278	\$0	\$185,778,500	\$0	\$0	\$0	\$0	\$185,881,778	0.3387	\$62,958,158
17	\$103,278	\$0	\$185,778,500	\$0	\$0	\$0	\$0	\$185,881,778	0.3166	\$58,850,171
18	\$0	\$0	\$0	\$0	\$83,592,000	\$0	\$0	\$83,592,000	0.2959	\$24,734,873
19	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	0.2765	\$0
20	\$0	\$0	\$0	\$0	\$0	\$23,326,000	\$308,000	\$23,634,000	0.2584	\$6,107,026
21	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	0.2415	\$0
22	\$0	\$0	\$0	\$0	\$83,592,000	\$0	\$0	\$83,592,000	0.2257	\$18,866,714
23	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	0.2109	\$0
24	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	0.1971	\$0
25	\$0	\$0	\$0	\$0	\$0	\$23,326,000	\$308,000	\$23,634,000	0.1842	\$4,353,383
26	\$0	\$0	\$0	\$0	\$83,592,000	\$0	\$0	\$83,592,000	0.1722	\$14,394,542
27	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	0.1609	\$0
28	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	0.1504	\$0
29	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	0.1406	\$0
30	\$0	\$0	\$0	\$0	\$83,592,000	\$23,326,000	\$308,000	\$107,226,000	0.1314	\$14,089,496
31	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	0.1228	\$0
32	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	0.1147	\$0
33	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	0.1072	\$0
34	\$0	\$0	\$0	\$0	\$83,592,000	\$0	\$0	\$83,592,000	0.1002	\$8,375,918
35	\$0	\$0	\$0	\$0	\$0	\$23,326,000	\$308,000	\$23,634,000	0.0937	\$2,214,506
36	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	0.0875	\$0
37	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	0.0818	\$0
38	\$0	\$0	\$0	\$0	\$83,592,000	\$0	\$0	\$83,592,000	0.0765	\$6,394,788
39	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	0.0715	\$0
40	\$0	\$0	\$0	\$0	\$0	\$23,326,000	\$308,000	\$23,634,000	0.0668	\$1,578,751
41	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	0.0624	\$0
42	\$0	\$0	\$0	\$0	\$83,592,000	\$0	\$0	\$83,592,000	0.0583	\$4,873,414
43	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	0.0545	\$0
44	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	0.0509	\$0
45	\$0	\$0	\$0	\$0	\$0	\$23,326,000	\$308,000	\$23,634,000	0.0476	\$1,124,978
46	\$0	\$0	\$0	\$0	\$83,592,000	\$0	\$0	\$83,592,000	0.0445	\$3,719,844
47	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	0.0416	\$0
48	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	0.0389	\$0
49	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	0.0363	\$0
50	\$0	\$0	\$0	\$0	\$83,592,000	\$23,326,000	\$308,000	\$107,226,000	0.0339	\$3,634,961
51	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	0.0317	\$0
52	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	0.0297	\$0
53	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	0.0277	\$0
54	\$0	\$0	\$0	\$0	\$83,592,000	\$0	\$0	\$83,592,000	0.0259	\$2,165,033
55	\$0	\$0	\$0	\$0	\$0	\$23,326,000	\$308,000	\$23,634,000	0.0242	\$571,943
56	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	0.0226	\$0
57	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	0.0211	\$0
58	\$0	\$0	\$0	\$0	\$83,592,000	\$0	\$0	\$83,592,000	0.0198	\$1,655,122
59	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	0.0185	\$0
60	\$0	\$0	\$0	\$0	\$0	\$23,326,000	\$308,000	\$23,634,000	0.0173	\$408,868
61	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	0.0161	\$0
62	\$0	\$0	\$0	\$0	\$83,592,000	\$0	\$0	\$83,592,000	0.0151	\$1,262,239
63	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	0.0141	\$0
64	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	0.0132	\$0
65	\$0	\$0	\$0	\$0	\$0	\$23,326,000	\$308,000	\$23,634,000	0.0123	\$290,698
66	\$0	\$0	\$0	\$0	\$83,592,000	\$0	\$0	\$83,592,000	0.0115	\$961,308
67	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	0.0107	\$0
68	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	0.0100	\$0
69	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	0.0094	\$0
70	\$0	\$0	\$0	\$0	\$83,592,000	\$23,326,000	\$308,000	\$107,226,000	0.0088	\$943,589
71	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	0.0082	\$0
72	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	0.0077	\$0
73	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	0.0072	\$0
74	\$0	\$0	\$0	\$0	\$83,592,000	\$0	\$0	\$83,592,000	0.0067	\$560,066
75	\$0	\$0	\$0	\$0	\$0	\$23,326,000	\$308,000	\$23,634,000	0.0063	\$148,894

TABLE PV-G

## PRESENT VALUE ANALYSIS

Alternative G

Site: Portland Harbor Superfund Site  
 Location: Portland, Oregon  
 Phase: Draft Feasibility Study (-30% to +50%)  
 Base Year: 2015

Year <sup>1</sup>	Capital Costs (Institutional Controls) <sup>2</sup>	Capital Costs (Monitored Natural Recovery) <sup>2</sup>	Capital Costs (Technology Assignments) <sup>2</sup>	Annual O&M Costs	Periodic Costs (Long Term Monitoring and Monitored Natural Recovery)	Periodic Costs (Long Term Operations and Maintenance and Institutional Controls)	Periodic Costs (Five-Year Site Reviews)	Total Annual Expenditure <sup>3</sup>	Discount Factor (7.0%)	Present Value <sup>4</sup>
76	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	0.0058	\$0
77	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	0.0055	\$0
78	\$0	\$0	\$0	\$0	\$83,592,000	\$0	\$0	\$83,592,000	0.0051	\$426,319
79	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	0.0048	\$0
80	\$0	\$0	\$0	\$0	\$0	\$23,326,000	\$308,000	\$23,634,000	0.0045	\$106,353
81	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	0.0042	\$0
82	\$0	\$0	\$0	\$0	\$83,592,000	\$0	\$0	\$83,592,000	0.0039	\$326,009
83	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	0.0036	\$0
84	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	0.0034	\$0
85	\$0	\$0	\$0	\$0	\$0	\$23,326,000	\$308,000	\$23,634,000	0.0032	\$75,629
86	\$0	\$0	\$0	\$0	\$83,592,000	\$0	\$0	\$83,592,000	0.0030	\$250,776
87	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	0.0028	\$0
88	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	0.0026	\$0
89	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	0.0024	\$0
90	\$0	\$0	\$0	\$0	\$83,592,000	\$23,326,000	\$308,000	\$107,226,000	0.0023	\$246,620
91	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	0.0021	\$0
92	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	0.0020	\$0
93	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	0.0019	\$0
94	\$0	\$0	\$0	\$0	\$83,592,000	\$0	\$0	\$83,592,000	0.0017	\$142,106
95	\$0	\$0	\$0	\$0	\$0	\$23,326,000	\$308,000	\$23,634,000	0.0016	\$37,814
96	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	0.0015	\$0
97	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	0.0014	\$0
98	\$0	\$0	\$0	\$0	\$83,592,000	\$0	\$0	\$83,592,000	0.0013	\$108,670
99	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	0.0012	\$0
100	\$0	\$0	\$0	\$0	\$0	\$23,326,000	\$308,000	\$23,634,000	0.0012	\$28,361
<b>TOTALS:</b>	\$1,859,000	\$9,795,000	\$3,344,013,000	\$0	\$2,256,984,000	\$466,520,000	\$6,160,000	\$6,085,331,000		\$2,489,085,628
<b>TOTAL PRESENT VALUE OF ALTERNATIVE G<sup>5</sup></b>										<b>\$2,489,090,000</b>

**Notes:**

<sup>1</sup> The alternative is expected to require cost expenditures for perpetuity since some contamination within the sediment bed and associated riverbank soils would remain in-place that do not allow for unrestricted use or unlimited exposure to human or ecological receptors. However the period of analysis was assumed to be 100 yrs beyond the construction in Year 0.

<sup>2</sup> Capital costs, for purposes of this analysis, are assumed to be distributed as indicated on Table CS-G.

<sup>3</sup> Total annual expenditure is the total cost per year with no discounting.

<sup>4</sup> Present value is the total cost per year including a 7.0% discount factor for that year. See Table PV-ADRFT for details.

<sup>5</sup> Total present value is rounded to the nearest \$10,000. Inflation and depreciation are excluded from the present value cost.

Costs presented for this alternative are expected to have an accuracy between -30% to +50% of actual costs, based on the scope presented.

They are prepared solely to facilitate relative comparisons between alternatives for FS evaluation purposes.

## Exhibit 2

Comparison of Constant Dollar Costs and Present Value Costs

Alternatives B, D, E, F, and G as Presented in the Draft FS

Two Site-Wide Monitoring and Monitored Natural Recovery Frequency Scenarios (Current Monitoring Frequency versus 5-Year Frequency)

Scenario	Alternative B Total Expenditures		Alternative D Total Expenditures		Alternative E Total Expenditures		Alternative F Total Expenditures		Alternative G Total Expenditures	
	Constant Dollar Cost	Present Value Cost	Constant Dollar Cost	Present Value Cost	Constant Dollar Cost	Present Value Cost	Constant Dollar Cost	Present Value Cost	Constant Dollar Cost	Present Value Cost
Monitoring Frequency Reduced (Monitoring Every 5 Years)	\$920,764,000	\$717,020,000	\$1,321,246,000	\$1,006,440,000	\$1,877,650,000	\$1,351,720,000	\$2,915,688,000	\$1,884,510,000	\$3,999,023,000	\$2,241,800,000
Current Monitoring Frequency Assumptions (Base Estimate Scenario)	\$1,041,428,000	\$790,870,000	\$1,483,174,000	\$1,105,550,000	\$2,104,582,000	\$1,490,610,000	\$3,191,948,000	\$2,053,600,000	\$4,333,391,000	\$2,446,450,000

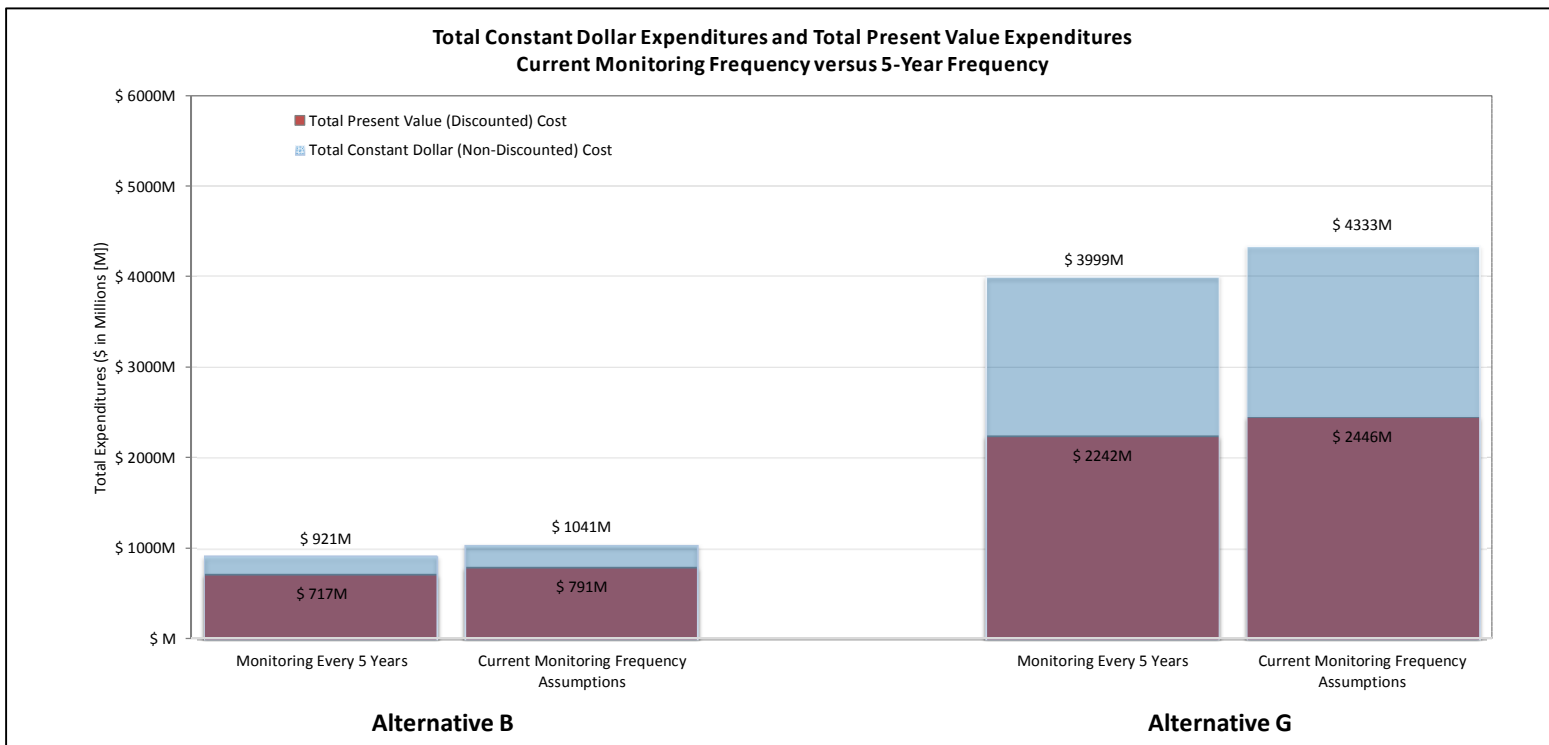


Exhibit 3

Comparison of Constant Dollar Costs and Present Value Costs

Alternatives B, D, E, F, and G as Presented in the Draft FS

Three Subtitle C/TSCA Disposal Volume Scenarios (Current Subtitle C/TSCA Disposal Volume versus Subtitle C/TSCA Disposal Volume  $\pm$  15%)

Scenario	Alternative B Total Expenditures		Alternative D Total Expenditures		Alternative E Total Expenditures		Alternative F Total Expenditures		Alternative G Total Expenditures	
	Constant Dollar Cost	Present Value Cost	Constant Dollar Cost	Present Value Cost	Constant Dollar Cost	Present Value Cost	Constant Dollar Cost	Present Value Cost	Constant Dollar Cost	Present Value Cost
Reduced Subtitle C Disposal Volume (-15%)	\$994,949,000	\$748,760,000	\$1,426,357,000	\$1,055,700,000	\$2,042,659,000	\$1,439,600,000	\$3,121,041,000	\$2,003,380,000	\$4,259,383,000	\$2,402,200,000
Current Subtitle C/TSCA Disposal Volume	\$1,041,428,000	\$790,870,000	\$1,483,174,000	\$1,105,550,000	\$2,104,582,000	\$1,490,610,000	\$3,191,948,000	\$2,053,600,000	\$4,333,391,000	\$2,446,450,000
Increased Subtitle C Disposal Volume (+15%)	\$1,087,909,000	\$832,980,000	\$1,539,993,000	\$1,155,410,000	\$2,166,506,000	\$1,541,620,000	\$3,262,856,000	\$2,103,820,000	\$4,407,401,000	\$2,490,710,000

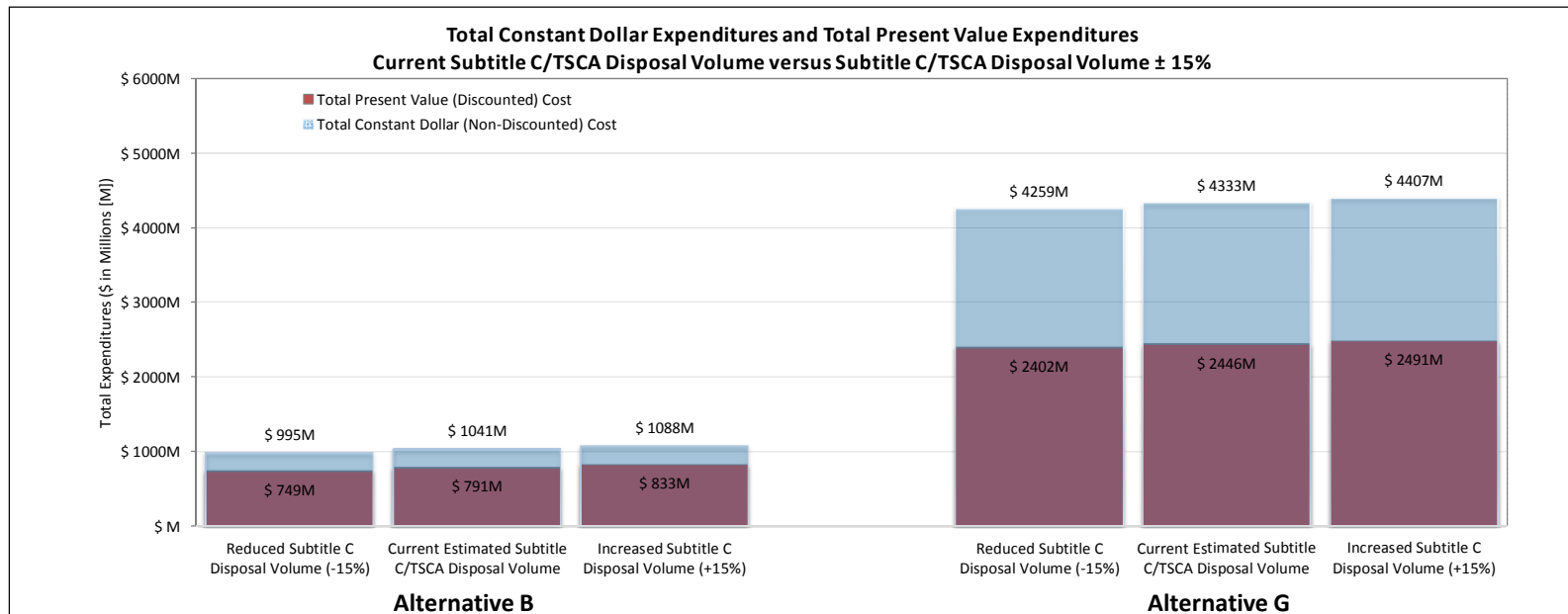


Exhibit 4

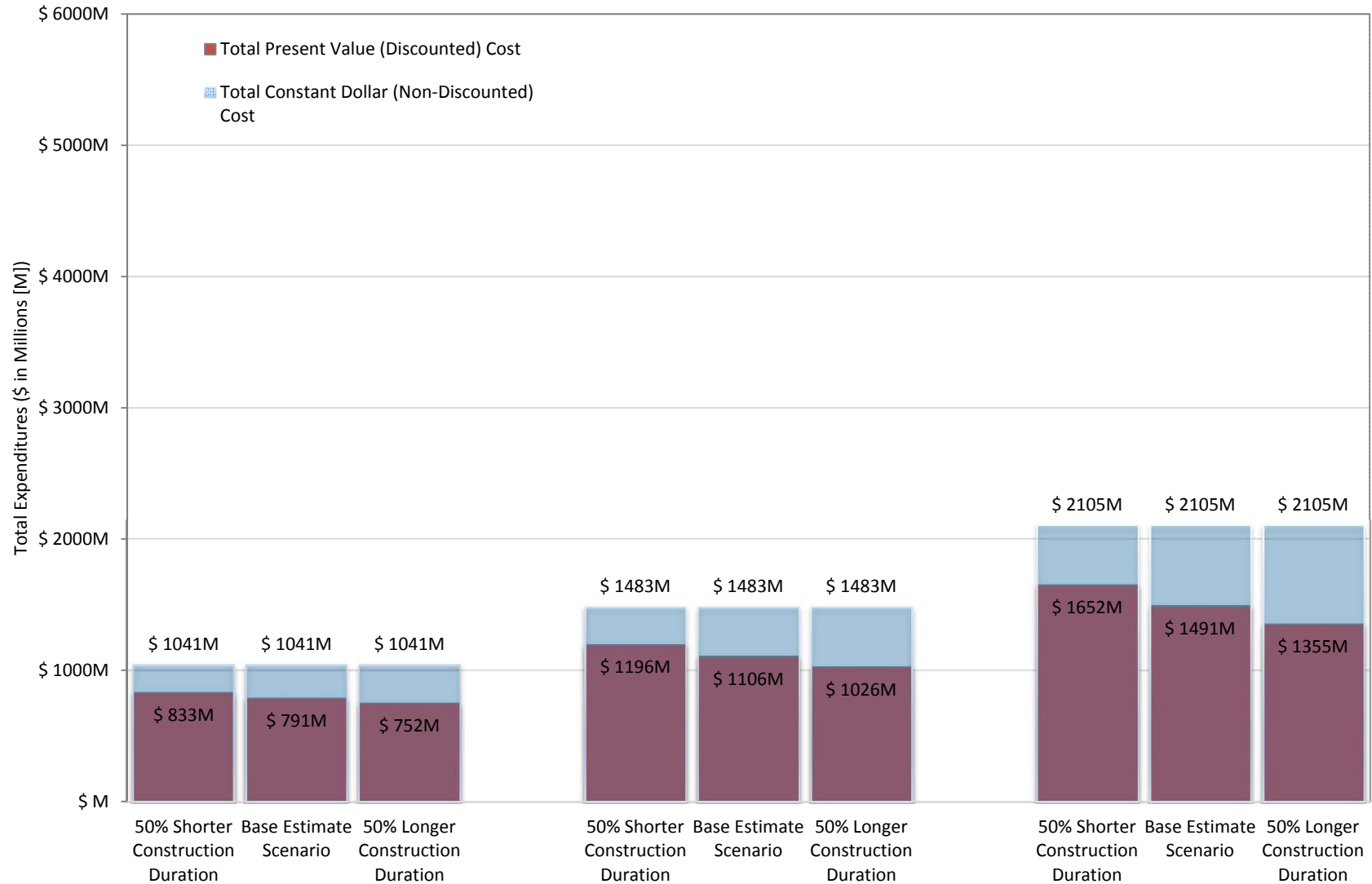
Comparison of Constant Dollar Costs and Present Value Costs

Alternatives B, D, E, F, and G as Presented in the Draft FS

Three Construction Duration Scenarios (Currently Assumed Construction Duration versus Construction Duration  $\pm$  50%)

Scenario	Alternative B Total Expenditures		Alternative D Total Expenditures		Alternative E Total Expenditures		Alternative F Total Expenditures		Alternative G Total Expenditures	
	Constant Dollar Cost	Present Value Cost	Constant Dollar Cost	Present Value Cost	Constant Dollar Cost	Present Value Cost	Constant Dollar Cost	Present Value Cost	Constant Dollar Cost	Present Value Cost
Reduced Construction Duration (50% Shorter Construction Duration)	\$1,041,428,000	\$833,160,000	\$1,483,174,000	\$1,196,330,000	\$2,104,582,000	\$1,652,250,000	\$3,191,948,000	\$2,390,800,000	\$4,333,391,000	\$3,037,440,000
Currently Assumed Construction Duration	\$1,041,428,000	\$790,870,000	\$1,483,174,000	\$1,105,550,000	\$2,104,582,000	\$1,490,610,000	\$3,191,948,000	\$2,053,600,000	\$4,333,391,000	\$2,446,450,000
Increased Construction Duration (50% Longer Construction Duration)	\$1,041,428,000	\$752,160,000	\$1,483,174,000	\$1,025,950,000	\$2,104,582,000	\$1,354,650,000	\$3,191,948,000	\$1,791,430,000	\$4,333,391,000	\$2,035,150,000

**Exhibit 4-B**  
**Total Constant Dollar Expenditures and Total Present Value Expenditures**  
**Currently Assumed Construction Duration versus Construction Duration ± 50%**



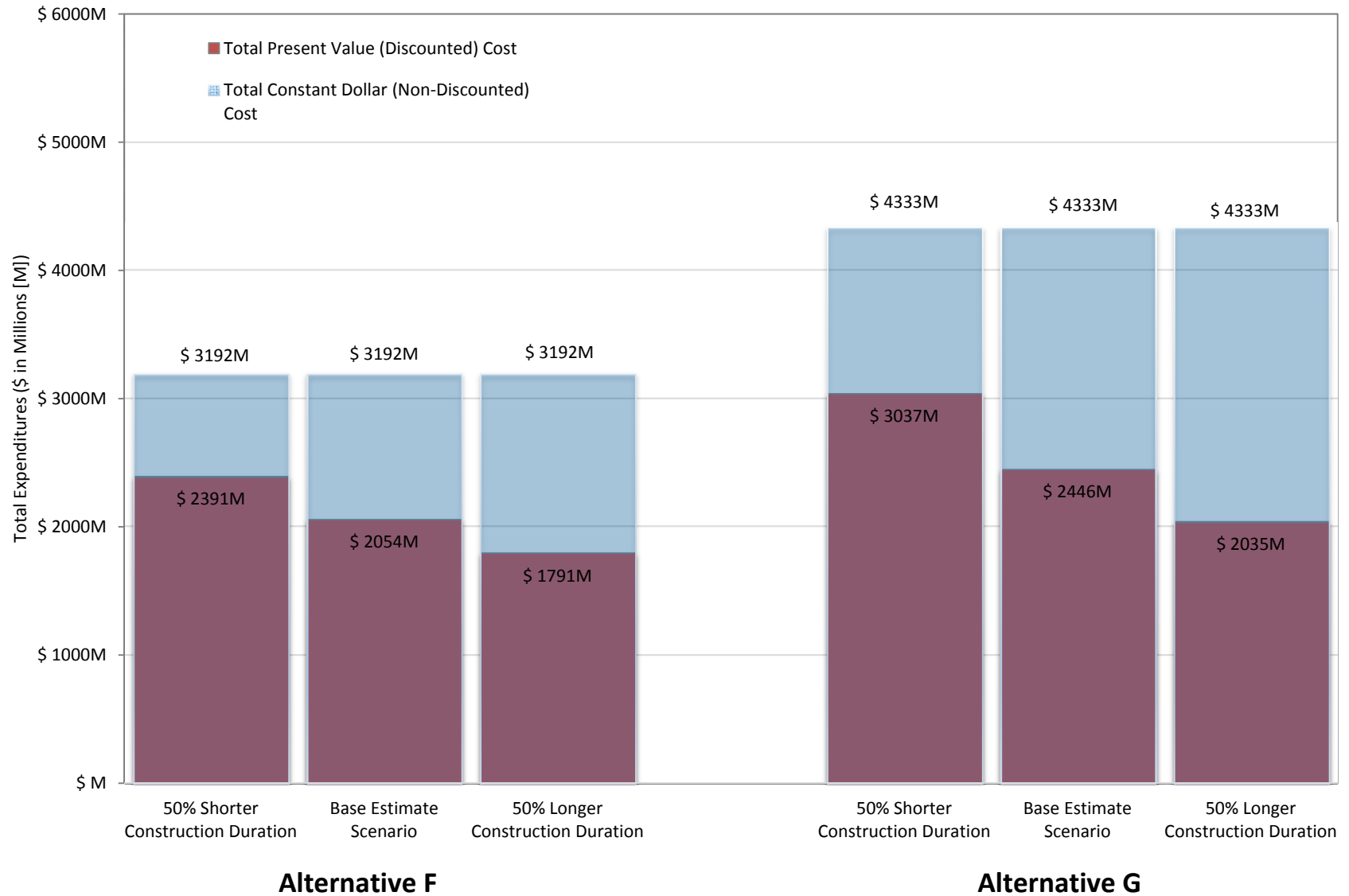
**Alternative B**

**Alternative D**

**Alternative E**

### Exhibit 4-C

#### Total Constant Dollar Expenditures and Total Present Value Expenditures Currently Assumed Construction Duration versus Construction Duration $\pm$ 50%





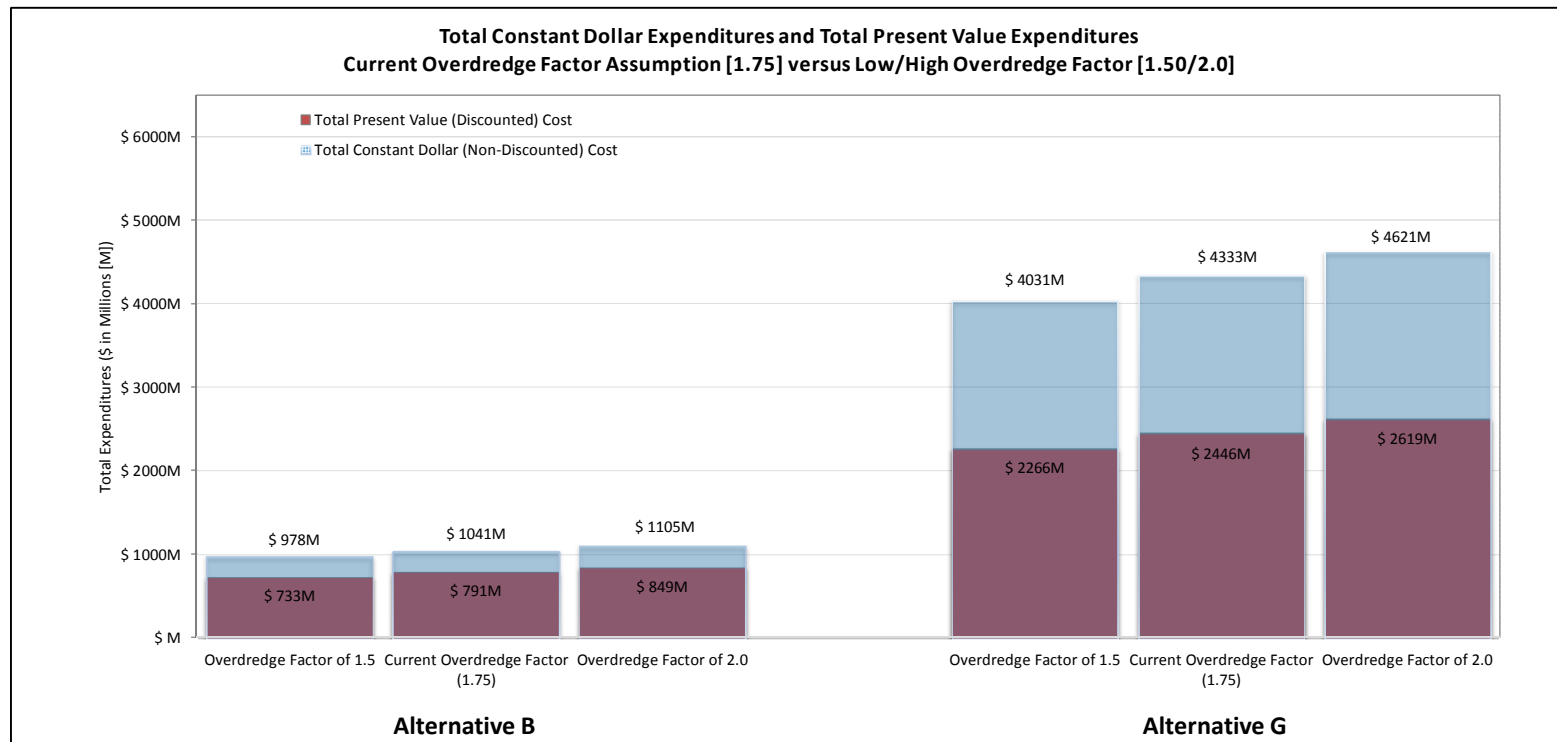
# Exhibit 5

## Comparison of Constant Dollar Costs and Present Value Costs

### Alternatives B, D, E, F, and G as Presented in the Draft FS

#### Three Overdredge Scenarios (Current Overdredge Factor Assumption [1.75] versus Low/High Overdredge Factor [1.50/2.0])

Scenario	Alternative B Total Expenditures		Alternative D Total Expenditures		Alternative E Total Expenditures		Alternative F Total Expenditures		Alternative G Total Expenditures	
	Constant Dollar Cost	Present Value Cost	Constant Dollar Cost	Present Value Cost	Constant Dollar Cost	Present Value Cost	Constant Dollar Cost	Present Value Cost	Constant Dollar Cost	Present Value Cost
Reduced Overdredge Factor (Overdredge Factor of 1.5)	\$977,604,000	\$733,040,000	\$1,390,464,000	\$1,024,200,000	\$1,976,776,000	\$1,385,330,000	\$2,977,022,000	\$1,901,390,000	\$4,031,477,000	\$2,265,920,000
Current Overdredge Factor (Overdredge Factor of 1.75)	\$1,041,428,000	\$790,870,000	\$1,483,174,000	\$1,105,550,000	\$2,104,582,000	\$1,490,610,000	\$3,191,948,000	\$2,053,600,000	\$4,333,391,000	\$2,446,450,000
Increased Overdredge Factor (Overdredge Factor of 2.0)	\$1,105,252,000	\$848,700,000	\$1,575,884,000	\$1,186,900,000	\$2,232,388,000	\$1,595,900,000	\$3,406,871,000	\$2,205,810,000	\$4,621,246,000	\$2,618,570,000



## **Attachment C**

# Disposed Material Management (DMM) Scenario Comparison

## Draft Feasibility Study

### Portland Harbor Superfund Site

## Introduction

CDM Federal Programs Corporation (CDM Smith) has been tasked to complete detailed analysis cost estimates for the Portland Harbor Superfund Site Draft Feasibility Study (FS), herein referred to as the draft FS cost estimates. During development of the draft FS cost estimates, EPA requested a comparison be performed to obtain a better understanding of the differences on the total costs (both constant dollar (non-discounted) costs and present value dollar (discounted) costs) for two disposed material management (DMM) scenarios.

## General Methodology

Dredged material removed from the Site would be managed in accordance with one of the two DMM scenarios:

- DMM Scenario 1: Confined Disposal Facility (CDF), and Off-site Disposal
- DMM Scenario 2: Off-Site Disposal

DMM Scenario 2 was used as the basis for the draft FS cost estimates provided for each alternative as discussed in Section 4. The cost estimate assumptions for DMM Scenario 2 are listed in Attachment A (Methodology and Organization of Detailed Analysis Cost Estimates). The following assumptions were made for purposes of the detailed analysis cost estimates with respect to management, disposal, and ex situ treatment (if needed) at off-site facilities:

- All NRC/NAPL PTW will be disposed of at the representative Subtitle C/TSCA facility.
- Ex situ treatment of all NRC/NAPL PTW will be performed at the Subtitle C/TSCA facility before disposal because the representative Subtitle C/TSCA facility has treatment capabilities at the facility.
- Contaminated materials designated for the Subtitle C/TSCA facility need to be sufficiently managed through pre-treatment (dewatering and/or amendment with diatomaceous earth) to pass the paint filter test.
- All other contaminated sediment and riverbank soils designated for off-site disposal (including remaining PTW) will be disposed of at the representative Subtitle D facility.
- No treatment will be performed for contaminated sediment and riverbank soils designated for the Subtitle D facility as they are assumed to have waste classifications and contaminant concentrations when generated that are acceptable to the facility.
- Contaminated materials designated for the Subtitle D facility need to be sufficiently managed through pre-treatment (dewatering) to minimize free liquids.

DMM Scenario 1 provides an option for onsite disposal of dredged sediment or excavated riverbank soils within a CDF to lessen offsite impacts and potentially reduce overall alternative costs. The following

assumptions were made for purposes of the DMM Scenario 2 with respect to management, disposal, and ex situ treatment (if needed):

- Similar to DMM Scenario 2, all NRC/NAPL PTW will be disposed of at the representative Subtitle C/TSCA facility, and the assumptions for ex situ treatment, materials handling and management of NRC/NAPL PTW will be the same as those presented for DMM Scenario 2 above.
- Construction and disposal of contaminated materials within a CDF for DMM Scenario 1 is assumed to be located at the Port of Portland Terminal 4. Based on the current design, the capacity of the Terminal 4 CDF is 670,000 cubic yards of dredged contaminated sediments.
- A minimum threshold volume of material dredged/excavated to justify the CDF's construction is assumed to be 1,005,000 cubic yards. Based on that threshold relative to the estimated volume of dredged sediment and soil that is potentially acceptable for placement in a CDF, this CDF option was evaluated for Alternatives E, F and G.
- No treatment will be performed for contaminated sediment and riverbank soils designated for either the CDF or the Subtitle D facility as they are assumed to have waste classifications and contaminant concentrations when generated that are acceptable to either the CDF or the Subtitle D facility, as appropriate.
- Contaminated materials designated for the Subtitle D facility need to be sufficiently managed through pre-treatment (dewatering) to minimize free liquids.

## Conclusions

Alternatives B and D were not evaluated for DMM Scenario 1 and thus did not realize a cost difference (savings). Alternatives E, F, and G were evaluated for DMM Scenario 1 as well as Scenario 2 and thus cost differences (potential savings) could be estimated and are presented in **Exhibit 1**.

The constant dollar (non-discounted) cost difference between DMM Scenarios 2 and 1 for Alternatives E, F, and G are the same (approximately \$35,290,000). The present value dollar (discounted) cost difference between DMM Scenarios 2 and 1 for Alternatives E, F, and G are approximately \$29,070,000, \$24,990,000, and \$21,100,000 respectively. The constant dollar cost differences between DMM Scenarios 2 and 1 for Alternatives E, F, and G were the same because the CDF disposal volume (670,000 cubic yards) diverted from Subtitle D offsite disposal is the same for Alternatives E, F and G regardless of total volume dredged for each alternative. The present value costs cost differences between DMM Scenarios 2 and 1 for Alternatives E, F, and G vary because the capital costs for each alternative are discounted over differing construction durations for present value analysis.

## Exhibit 1

### Comparison of Constant Dollar Costs and Present Value Costs

#### Alternatives B, D, E, F, and G as Presented in the Draft FS

#### Comparison of DMM Scenario 1 (CDF Option) and DMM Scenario 2 (Offsite Disposal)

Scenario	Alternative B Total Expenditures		Alternative D Total Expenditures		Alternative E Total Expenditures		Alternative F Total Expenditures		Alternative G Total Expenditures	
	Constant Dollar Cost	Present Value Cost	Constant Dollar Cost	Present Value Cost	Constant Dollar Cost	Present Value Cost	Constant Dollar Cost	Present Value Cost	Constant Dollar Cost	Present Value Cost
DMM Scenario 2 (Off-Site Disposal)	\$1,041,428,000	\$790,870,000	\$1,483,174,000	\$1,105,550,000	\$2,104,582,000	\$1,490,610,000	\$3,191,948,000	\$2,053,600,000	\$4,333,391,000	\$2,446,450,000
DMM Scenario 1 (CDF and Off-Site Disposal)	\$1,041,428,000	\$790,870,000	\$1,483,174,000	\$1,105,550,000	\$2,069,298,000	\$1,461,540,000	\$3,156,663,000	\$2,028,610,000	\$4,298,107,000	\$2,425,350,000
<b>Cost Difference (Savings)</b>	<b>\$0</b>	<b>\$0</b>	<b>\$0</b>	<b>\$0</b>	<b>\$35,290,000</b>	<b>\$29,070,000</b>	<b>\$35,290,000</b>	<b>\$24,990,000</b>	<b>\$35,290,000</b>	<b>\$21,100,000</b>

Note: Cost Difference (Savings) is rounded to the nearest \$10,000

